RAILROAD GAZETTE

FRIDAY, AUGUST 5.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

New Companies Organized.—Chicago, St. Paul & Kansas files articles in Kansas.—Poughkeepsie, Hartford & New England files articles in New York.—State Line & Indiana City files articles in Indiana.

Changes and Extensions—*Dakota:* Minneapolis & St. Louis completed to Forman, Dak.—*Georgia:* Marietta & North Georgia is refused permission to extend to Atlanta.; Georgia Midland & Gulf completed to McDonough.—*Illinois:* South Chicago & Southern nearly completed; Chicago & Eastern Illinois completed to Tuscola; Minnesota & Northwestern runs trains into Chicago.—*Indiana:* Leroy & Eastern and Lebanon & Western consolidated.—*New York:* Long Island to build a branch to Oyster Bay, L. I.—*Pennsylvania:* Harvey's Lake road opened.

Elections.—Baltimore & Ohio, J. Van Smith, Division Superintendent.—Hartford & Connecticut Western, J. W. Husted, President.—Illinois Central, L. T. Moore, Chief Engineer.—New Haven & Derby, E. P. North, Chief Engineer.

Leases and Sales.—New York City & Northern to be sold Aug. 17.—New York & New England leases the line from Franklin to Ashland, Mass.

Miscellaneous.—St. Paul, Minneapolis & Manitoba orders six steel vessels for a lake line.—Atchison, Topeka & Santa Fe issues $10,000,000 new stock.—Canadian Pacific will have a steamer line of its own to San Francisco.—Jury blames engineman, conductor and managers for St. Thomas collision.—New Agreement of Southern Railway & Steamship Association.—Continuation of investigation of Pacific roads.—Wells & French Car Works burned.—Pennsylvania establishes a Southern fast freight line.—Work on the Arthur Kill bridge to be hastened.

Traffic.—Anthracite coal shipments for week ending July 30, show an increase of 6.1 per cent. over the same week last year; bituminous shipments show a decrease of 2.6 per cent.; coke for week ending July 23 shows decrease of 48 per cent. Cotton receipts, interior markets for week ending July 29 show a decrease of 84 per cent. as compared with corresponding period last year; shipments show a decrease of 83 per cent; seaboard receipts, a decrease of 71 per cent.; exports, a decrease of 0.3 per cent.; cotton in sight is less than at the same date last year by 18 per cent.

Contributions.

Driving Piles.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the specifications of many roads it is required that a pile be driven as long as it is settled two inches by a blow from a two thousand pound hammer falling twenty feet, *or its equivalent*. What is an interpretation of the latter clause?

Last year I had charge of pile-driving for a railroad company in eastern Nebraska. In one place, where the bottom was an alluvial deposit for a considerable depth, running into alkaline strata, I found the following penetration:

Fall	3	Distance,	25 ft.	Settled	Pile,	1.9	ft.
"	4	"	20 "	"	"	1.2	"
"	5	"	30 "	"	"	1.6	"
"	6	"	20 "	"	"	0.4	"
"	7	"	30 "	"	"	1.1	"
"	8	"	20 "	"	"	0.3	"
"	9	"	20 "	"	"	0.2	"
"	10	"	20 "	"	"	0.2	"
"	11	"	30 "	"	"	0.7	"

These distances of fall vary a foot, perhaps, from distances given. It will be seen that with a 10 ft. increase of fall, the penetration was more than doubled.

In another case where the material was a coarse sand, approaching a gravel, an increase of 10 ft. gave less penetration. That is, with a fall of 20 ft. the pile settled from three to five-tenths of a foot, while a 30-ft. fall gave a scant two-tenths.

In this alluvial soil I found that a pile that was sharpened would drive several feet further than one with a blunt point. That is, the square ended pile would bring up hard and firm with that distance less penetration. I thought the blunt ends were firmest. In the sand one drove as well as the other, unless the point were shod with iron when the pointed ones drove best.

In this alluvial soil a pile partly driven and left over night gained no appreciable set. One driven Saturday and left until Monday gained very little. In the sand one left while the men went to dinner would become so firm that it would take one or two blows to get it started.

I saw an account in a newspaper last summer of some pile-driving on the Minneapolis & Pacific Railroad near Minneapolis, Minn. The account stated that the piles billed for a certain opening were delivered and the pile-driver began work. In the first bent pile No. 1 was put in the leads, and the hammer lowered on it. It settled nearly to grade. The hammer was dropped from a height of four feet and settled it below grade. Pile No. 2 was set, and the hammer lowered upon it and left there. It settled about as the first. It was left from 4 p. m. that day until arrival of the Chief Engineer after noon the next day. He ordered the hammer dropped with a fall of 20 ft., and to the surprise of all it was the third blow with this fall before the pile started. It was a one of the lakes near Minneapolis, I think, but do not know of the nature of the soil.

Who has had experience with different heights of fall, with sharp and blunt points and with "set?"

I would say that all above were driven in the summer time. In winter I have found it impracticable to use a long fall as the sap in the pile was frozen and head would splinter badly.

If there is no "equivalent" for the "2,000 pound hammer with 20-ft. fall," how is a man to adjust things when he has seven drivers on a piece of work with hammers varying in weight from 1,600 lbs. to 2,400 lbs., and leads ranging from 30 to 45 ft. in length? Is there any safe rule to guide one in such a case, and is there any rule that will help a man to get his bridges equally driven without doing injustice to the contractor?

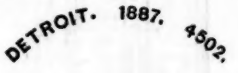
A. M. VAN AUKEN.

Marking Wheels.

MICHIGAN CENTRAL RAILROAD CO.,
Master Car-Builder's Office.
DETROIT, Mich., August 1, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In order to a better understanding in the matter of replacement and billing of wheels under foreign cars, and to secure uniformity, we urge upon railroad companies the necessity (when ordering their cast wheels) of having name of maker, date and a number *cast* in raised letters and figures on the inside plate of wheel, thus:



Inside plate—Because not liable to be covered with grease or dirt.

Cast letters, raised—Because punching or painting is not readable.

Name of maker in one name, as "Scoville," "Griffin," "Detroit," "Chicago," etc.; not necessary to give initials or place.

We urge this because it costs nothing, because it is much more simple and satisfactery, and because it would be an actual saving in time and cuss words. Our car repairers are not all graduates in Hebrew, Greek and Latin, consequently have to spend considerable time in deciphering the inscriptions and hieroglyphics that some companies inscribe upon their wheels, outside and inside—inscriptions that rival those upon the Egyptian monuments. Let us have a reform in this matter.

E. R. E. C.,
Michigan Central Railroad Car Department.

The Rote Brake.

TO THE EDITOR OF THE RAILROAD GAZETTE.

Will you kindly make the following corrections in your notice of the Rote automatic brake, page 499, of your last week's issue?

1. In switching cars in a yard there is *no* lever that has to be turned—nothing has to be done; the car is always ready for forward or backward movement.

2. The engineer has not only to shut off steam, but to *put on his locomotive brake*, and, to cause effective and satisfactory application of the automatic car brake, needs the most powerful engine brake.

JAS. HOWARD,
Manager Beals Brake Co.

Proceedings of the Committee on Uniform Couplers.

The Committee on Uniform Draw-Bars and Couplers for Freight Service, appointed by a combination of important roads and which has recently been referred to in these columns, held a meeting in New York City, Wednesday, July 27. There were present Mr. Wm. P. Shinn, Chairman, and Messrs. A. G. Darwin, F. M. Wilder, James Meehan, Reuben Wells and T. L. Chapman. Messrs O. A Haynes and W. T. Small were unavoidably absent. Captain O. E. Michaelis, of the Ordnance Department, United States Army, the expert on physical tests, was present at the request of the Committee.

The various points involved in the Committee's programme of tests were freely discussed with the following result:

First. On motion it was unanimously resolved: That after full consideration of the results of the preliminary tests made under the direction of the Committee, and in view of the evident superiority of a close coupler of the vertical hook type, which will couple to and with others of the same class and type, this Committee will admit to further consideration only such couplers as are of the type known as the Janney type of vertical hook couplers.

Second. Capt. O. E. Michaelis presented and read to the Committee his preliminary report regarding a programme of physical tests of couplers. The report was on motion unanimously accepted without discussion.

In this report Capt. Michaelis assumes that laboratory physical tests have heretofore had for their primary object the determination of the strength of the knuckles, hooks, tumblers or by whatever name the immediate coupling devices may be called, and that critical examination into other integral parts of the coupling devices, such as the heads or housings, and the bearing pins used as axes of rotation or locks has been comparatively neglected. He believes, however, that a programme of drop tests can be devised which will reproduce every circumstance and contingency of dynamic strain, developed in actual service, and which will give unimpeachable results, in less time, at less cost and in a more controllable manner than if the same couplers were tried on moving cars. Then with the results of such a contemplated exhaustive test before it, together with the expert determination of its members, as to the adaptability of the coupler for its special work, the Committee could not fail to come to a correct decision.

Captain Michaelis makes the following suggestions about a programme of tests, viz., that the impact tests should be divided under two principal heads:

1st. Ordinary tests reproducing usual conditions of service; and 2d. Extraordinary tests reproducing unusual conditions of service. The preliminary tests should be service tests, and as the shocks incident to the service are due to guided blows, the colliding masses moving on rails, there can be no objection advanced to the use of a drop moving in vertical ways. A programme of bumping tests cannot fail to eliminate the systems not worthy of serious consideration, and its execution will incidentally and necessarily develop the ability of the respective couplers to withstand the pulling strains due to the starting or sudden speeding up of trains. It might be well to subject the selected couplers to static strains on the testing machine, within limits, based upon conditions fixed by the Committee as composed of railroad experts; for instance, the steepest actual grade and the heaviest train going over it might be taken as the basis for this series of strain tests.

Third. On motion it was unanimously resolved: That the report of Capt. Michaelis be referred to the Committee on Physical Tests, which was appointed at a previous meeting with authority to make such physical tests as they may deem to be necessary for the full guidance of the committee in conformity with the suggestions of the report.

The sub-committee on physical tests consists of Messrs. Wm. P. Shinn, Reuben Wells and F. M. Wilder, with Capt. O. E. Michaelis as expert.

Fourth. In order to make provision for the service tests, it was on motion unanimously resolved: That the secretary be instructed to call upon the owners of the couplers which are to be further investigated by the Committee, requesting each to furnish the Committee with five cars of forty thousand pounds capacity or over, equipped with his coupler and delivered at such point as may be arranged for, where service tests can be made of such cars in trains, and that the owners of such couplers as do not already couple with the Janney be requested to make such modifications as will enable them to do so, and use only such modified couplers on the cars sent to the Committee.

It was also further provided that the matter of the arrangement for service tests should be referred to the same sub-committee as that which had charge of the physical tests, viz.: Messrs. Wm. P. Shinn, F. M. Wilder and Reuben Wells.

After the transaction of some other routine business, the Committee adjourned, subject to the call of the chairman.

Buckling of Rails from Tight Joints.

In a recent number of *The Engineer*, Prof. A. G. Greenhill writes: "Railroad engineers are well acquainted with the trouble given by a length of line in which the rails are placed end to end too closely, so as not to allow sufficient space for expansion under varying temperature. Then, when a hot day comes, the rails are not capable of expanding longitudinally, and so are compelled to buckle sideways; the line twists and goes crooked into a serpentine shape. Supposing, then, that from any cause the rails fit accurately end to end, I propose to investigate the subsequent rise of temperature at which the straight form of the line becomes unstable and the rails tend to buckle sideways, under the thrust due to the checked longitudinal expansion, employing the well-known theory of Euler on the stability and flexure of a straight column under a given thrust.

"Taking Fahrenheit's scale of temperature, the inch as unit of length, and the gravitation unit of force the pound, then if L denotes the length of a rail, and l the elongation due to a rise of temperature $t°$ F.,

$$\frac{l}{L} = c\,t,$$

where $c = .00000642$, the co-efficient of longitudinal expansion of iron for 1° F.

"But by Hooke's law the thrust P required to bring the rail back to its original length L is given by

$$\frac{P}{KE} = \frac{l}{L},$$

where K = sectional area of rail in square inches; and E = 29,000,000, Young's modulus of elasticity for wrought iron; so that $P = K\,E\,l \div L = K\,E\,c\,t$.

"Now, by Euler's theory of the stability and flexure of a straight uniform column under a given thrust P—Unwin, 'Machine Design,' p. 62—the rail will begin to buckle when

$$\frac{P}{K\,k^2\,E} = \frac{\pi^2}{a^2},$$

where a denotes the length of rail between two consecutive points of inflexion, and k is the radius of gyration of the cross section of the rail about an axis perpendicular to the plane of flexure.

"In consequence of the extra lateral flexural rigidity imparted by the fish-plates, we can begin by assuming that a is the length of a rail L, and that the points of inflexion are at the fish-plates; and then,

$$c\,t = \frac{l}{L} = \frac{P}{K\,E} = \pi^2\,\frac{k^2}{L^2};\ \text{or, } t = \frac{\pi^2\,k}{c\,L^2},$$

giving t, the rise of temperature at which the rails will begin to buckle, after they once abut end to end; a result which is seen to be independent of K, the sectional area of the rail, and E, the modulus of elasticity of the material of the rail.

"As a numerical example, take a 24-ft. rail; then

$$L = 24 \times 12 = 288;$$

and we may suppose $k^2 = \frac{1}{4}$ approximately; and we get

$$t = 4.634 = 4.6, \text{ say};$$

so that an increase of 4.6° F. will cause 24-ft. rails to buckle when once longitudinal extension is checked.

"Then, if p denotes the longitudinal pressure, in pounds per square inch, in the rail,

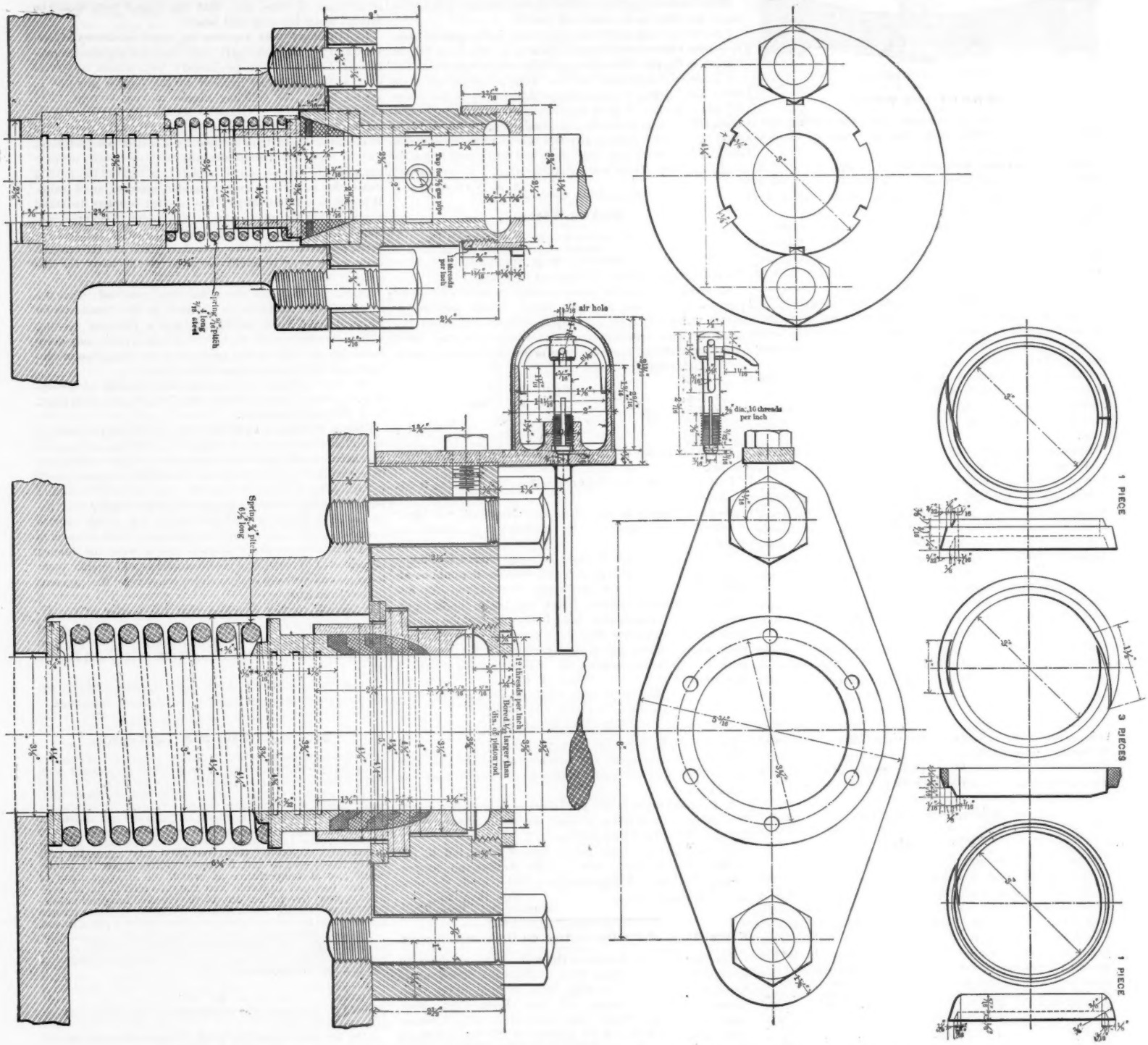
$$p = \frac{P}{K} = E\,c\,t,$$

and

$$p = 863;$$

the rails are then supposed to buckle.

"It is found now-a days with steel fish-bolts, screwed up with a long wrench, that the fish-plates sometimes grip the rails so tightly as to prevent longitudinal extension, and buckling will take place even when there is still room for expansion between the ends of the rails: careful instructions should then be issued to the platelayers to slacken the fish-bolts on a hot day. Otherwise the passage of a train over a



PISTON ROD AND VALVE STEM PACKING, CHICAGO, BURLINGTON & QUINCY RAILROAD.

straight piece of line will provide the predisposing cause of buckling, if the longitudinal expansion is ever so little checked. But unless the fish-plates are screwed up very tightly, it might happen that the length of an undulation between two consecutive points of inflexion was the length of two rails, three rails, etc., when the rise of temperature required for buckling would be only one-quarter, one-ninth, etc., respectively of the above rise of temperature for the buckling of one rail length; so that the practical conclusion arrived at is, that the slightest rise of temperature will make a straight piece of railway line crooked, when once the rails fit tightly end to end. It is important, therefore, that the distance allowed between the adjacent ends of the rails should be such that the rails do not touch under the highest temperature to be expected at the place; so that in climates like those of Canada and Russia, where the range of temperature between summer and winter is very considerable, the contraction of the rails under the lowest possible cold will, in consequence of the above precaution, cause the interval between the rails to be sufficiently great to render rapid running dangerous or unpleasant. For instance, for a range of temperature of 180 degrees F., the distance between two 24-ft. rails at the lowest temperature would have to be about one-third of an inch."

From another London paper we take the following:

On the 16th May, on the Great North of Scotland Railway, between Buckpool and Port Gordon stations, a down express ran off the rails, causing some slight injuries to thirteen passengers, in addition to the engine driver, fireman and guard. Col. F. H. Rich, who inquired into the circumstances on behalf of the Board of Trade, reports that this accident, which might have been attended with most serious consequences, was caused by the express leaving the track at a place where the rails were bent and pushed out of their proper position by the expansion of the metals. This appears to have been caused by the heat of the sun. The permanent way was only about a year old, and, as there were sufficient spaces at the joints to allow the rails to expand, he can only attribute the buckling or bending of the rails to the excessive tightness of Ibbotson's patent fish bolts, which prevented the rails from extending between the fish plates, for which purpose the spaces are left between the rail joints. The track adjacent to where the accident happened was very deficient in ballast. It has been well ballasted since the accident at the place where it occurred. He attributes the accident in some measure to the deficiency of ballast, which allowed the full force of the sun to affect the rails and chairs. There was no ballast to fix and weight the sleepers and prevent them from lifting or slewing. In conclusion he states that joints may be so tight as to prevent the proper expansion and contraction of the rails, and judging from the evidence and experience on this subject on the Great North of Scotland Railway, he questions whether the fish bolts and nuts used on that road can be considered safe.

Piston Rod and Valve Stem Packing.

The accompanying illustrations represent the standard piston rod and valve stem packing used on the Chicago, Burlington & Quincy. The principle of the packing is essentially that of the Jerome packing, slightly modified in detail in order to give more play to allow for the rise and fall of the crosshead.

The average life of rings on road engines has been 50,000 miles, the rods being skimmed down $\frac{1}{64}$ in. It is considered that a 3-in. piston rod, if permitted to wear down to 2½ in. diameter, would run 1,000,000 miles. Little trouble is found from leakage.

Valve stems wear more rapidly and more unevenly owing to their varying travel. They are found to run on the average 25,000 miles before requiring truing up, when from $\frac{1}{32}$ in. to $\frac{1}{64}$ in. is taken off.

When hemp packing was used it was found that piston rods wanted renewal after four years' running, and valve stems after two years. The greater life of rods as well as packing is thus very noticeable. The wear is chiefly confined to the rings, the bushes needing renewal only when the engine receives a general repair.

One set of rings for one engine costs about 38 cents, and the complete set of packing about $28.

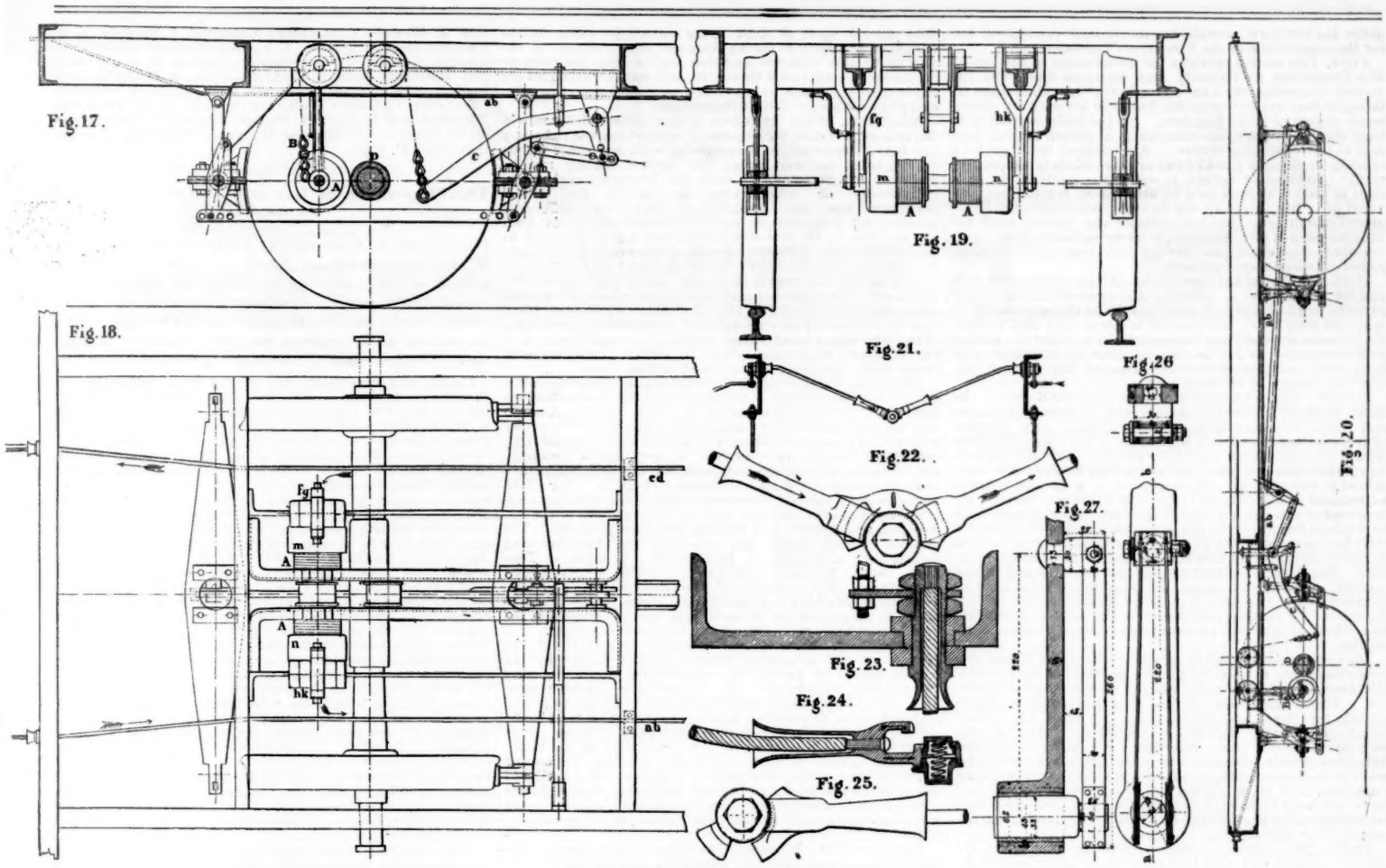
The Latest Form of the Achard Brake.

The State Railroad of France took up the experiments with the Achard brake, after they had been given up by the Eastern Railroad, and the description which follows is of the brake in its latest development, and as it has been used by a train which has been in service for four years, between Tours and the Sables d'Olonne without a failure or accident sufficient to interrupt traffic.

Figures 17 to 20 show the essential features of the apparatus. To apply the brake an electric current is passed through the conductors *ab*, *cd* (figs. 17, 18 and 19). This current at the same time passes through an electro magnet *A*, placed near to each braked axle and practically on the same level. This electro-magnet, hangs like a pendulum to the car frame by the rods *fg*, *hk* (figs. 18 and 19). The core of the maguet is an iron tube, which is keyed to the shaft which sustains it, and insulated from it. The conducting wire is wrapped about the middle of the tube and the ends are enlarged to the form shown at *m* and *n*, to act as friction pulleys against the cylinder *D*, which is keyed to the axle.

When the current is passed through the electro-magnet it is attracted to the axle, and the shaft which supports it turns by the rotation of the axle, taking up the chain *B*, which is attached to the principal lever *C*, which lever causes the application of the brakes. When the current ceases to pass, the pulleys *m* and *n* are no longer magnetized, and consequently are not attracted to the axle, the rods by which the magnet is suspended return to the vertical position, the chain is allowed to unroll, and the brake is released.

The current is produced by a Gramme dynamo machine placed on the locomotive and actuated by a small Brotherhood motor, which takes steam from the boiler. To apply the brakes the steam cock of this motor is opened more or less, which gives the dynamo the required speed, and the force of the application of the brake may be graduated at



THE ACHARD ELECTRIC BRAKE.

Scale for figs. 17, 18, 19 *and* 21, *about* 1 : 25.
" *fig.* 20 " 1 : 50.

will. The release of the brake is effected simply by cutting off steam from the motor.

In the earlier designs the chain *B* was double, and rolled round the extremities of the shaft, instead of being attached, as in the present design, at the middle.

The magnet wire is 1.8 millimetres in diameter and from 1,000 to 1,200 metres long, and each electric apparatus weighs at most 110 killogrammes (243 pounds).

It should be noticed that the poles present a large surface, to diminish as much as possible the wear upon them.

The magnet wire is connected with the two principal conductors, which extend the length of the train through the shaft of the electro, which, as has been said, is insulated from the magnet. This shaft receives the current at the same time through the suspension rods and by the contact springs. Fig. 19 will show the general arrangement, and figs. 26 and 27 the details. It will be noticed that these springs serve only to secure the passage of the current, and not, as formerly, to cause the suspended rods to return to the vertical po ition; this is effected simply by gravity. The chain which actuates the brake levers passes over two pulleys, which are independent of the suspended electric apparatus, and the brake pressure is proportional to the magnetic attraction, which makes possible a perfect graduation. In ordinary stops the chain has often a tension of 500 kilogrammes (1,100 pounds).

The coupling between cars is shown in figs. 21 and 25. A bronze plate inclosed in a case (see fig. 24) is constantly pressed upwards by a spring. Fig. 23 shows the manner of attaching and insulating the electric conductor and fig. 21 is a general view of the coupler. By this arrangement the bronze plates are pressed firmly against each other, and the rotary movement which is given to them in coupling keeps the surfaces in contact always sufficiently polished to insure good connection. In the breaking apart of cars the V-shaped coupling approaches the horizontal and uncouples itself.

As the electro-magnet is at the level of the axle when the car is empty, it is, of course, somewhat below that level in a loaded car, but no inconvenience arises from the fact, since the attraction is sufficient at a distance of 50 to 60 millimetres. On the other hand, if the apparatus were hung higher, it might happen that it would receive injurous blows from the upper side of the axle when the car was light.

To avoid the expense of an electro-magnet for each axle M. Achard has devised the system shown in fig. 20, which has been adopted with success on the Eastern Railroad and the State Railroad, using two chains and actuating the brakes of both axles by one apparatus. The same pressure is secured on each of the wheels.

M. Ricour, Chief Engineer of Material and Traction of the French State Railroads, who has directed all the experiments with this brake, says that the action of the electric brake is extremely rapid; that from the time of a whistle signal calling for brakes to the complete application of the brakes is less than three quarters of a second, and that in this particular the electric brake is almost perfection. The same is true of the rapidity of release. He also states that the application of the brake power may be graduated perfectly for the descent of grades, and that the expenditure of steam necessary to actuate the electric brakes is not worth consideration. No system is better adapted to the introduction into a train of one or more vehicles not provided with brakes, as a simple conducting wire is all that need be added. M. Ricour found also that trains could always be stopped quicker with the Achard than with the Westinghouse or Hardy brakes. It is stated further that the expense of maintenance has been found to be very small.

This brake in its latest form is not automatic, but the inventor has designed a system of automatic communication through a train by which the engineman or conductor would be immediately notified of any interruption in the continuity of the train. Moreover, it is undoubtedly very easy to arrange the apparatus so that the brakes used would be applied on the back part of the train, and it is suggested that this will be done by placing in front and rear cars an electric accumulator or dynamo machine, actuated from the axles, which would have the further advantage of relieving the locomotive of any supplementary machinery.

The *Bulletin of the International Commission* for May contains a detailed historical account of the development of this brake, as well as a description of the automatic train signaling device. The description and cuts given here are from that publication.

New Agreement of the Southern Railway and Steamship Association.

The thirteenth annual convention of this Association was held at Hygeia Hotel, Old Point Comfort, Virginia, Wednesday and Thursday, July 13 and 14, 1887.

Representatives of twenty-seven out of twenty-eight members of the Association were present, as follows:

For the Alabama Great Southern Railway Company and Cincinnati, New Orleans & Texas Pacific Railway Company—Charles Schiff, President; John C. Gault, General Manager; H Collbran, General Freight Agent.

For the Atlanta & West Point Railroad Company, and the Western Railway of Alabama—L. P. Grant, President; Cecil Gabbett, General Manager; Chas. H. Cromwell, General Freight Agent.

For the Central Railroad & Banking Company of Georgia—E. P. Alexander, President; M. S. Belknap, General Manager; W. F. Shellman, Traffic Manager; G. A. Whitehead, General Freight Agent.

For the East Tennessee, Virginia & Georgia Railway Company—E. B. Thomas, General Manager; Sol. Haas, Traffic Manager; T. S. Davant, General Freight Agent.

For the Georgia Railroad—J. W. Green, General Manager; E. R. Dorsey, General Freight Agent.

For the Georgia Pacific Railway Company—J. W. Johnston, President; I. Y. Sage, General Superintendent; G. S. Barnum, General Freight Agent.

For the Louisville & Nashville Railroad Company, and the South & North Alabama Railroad Company—M. H. Smith, Vice-President; E. B. Stahlman, Third Vice-President; J. M. Culp, General Freight Agent; Theo. Welch, General Freight Agent.

For the Savannah, Griffin & North Alabama Railroad Co. and the Ocean Steamship Co.—E. P. Alexander, President.

For the Nashville, Chattanooga & St. Louis Railway Co.—J. W. Thomas, President.

For the Norfolk & Western Railroad Co.—Chas. G. Eddy, Vice-President; A. Pope, General Freight Agent.

For the Port Royal & Augusta Railroad Co.—E. P. Alexander, President; W. F. Shellman, Traffic Manager; E. T. Charlton, General Freight Agent.

For the Richmond & Danville Railroad Co.—E. B. Thomas, General Manager; Peyton Randolph, Assistant General Manager; Sol. Haas, Traffic Manager; J. H. Dake, General Freight Agent.

For the Rome Railroad Co.—Eben Hillyer, President.

For the Seaboard & Roanoke Railroad Co.—John M. Robinson, President, and J. C. Winder.

For the South Carolina Railway Co.—A. P. Talmadge, President; John B. Peck, General Manager; S. B. Pickens, General Freight Agent.

For the Western & Atlantic Railroad Co.—Hon. Jos. E. Brown, President; R. A. Anderson, General Superintendent; J. M. Brown, General Freight Agent.

For the Wilmington, Columbia & Augusta, and the Wilmington & Weldon Railroad Companies—Henry Walters, General Manager; T. M. Emerson, General Freight Agent, and W. T. Walters.

For the Baltimore & Richmond Steamship Company—Geo. F. Needham, General Freight Agent.

For the Clyde Steam Lines—T. G. Eger, Traffic Manager.

For the Merchants & Miners' Transportation Company—V. D. Groner, General Agent.

For the New York & Charleston Steamship Company—T. G. Eger, Traffic Manager.

For the Old Dominion Steamship Company—John M. Robinson, Vice-President.

In addition to the representatives of the various members of the Association as above, there were also present the following gentlemen:

Thos. K. Scott, C. D. Owens, W. P. Hardee, E. P. McSwiney, O. V. Smith, W. H. Rhett, Thos. Pinckney, F. M. Ironmonger, O. H. Royer, L. D. Richardson, C. M. Wicker, R. W. Geiger, D. T. McCabe, E. D. T. Myers, R. B. Cooke, F. W. Clark, J. J. Griffin, B. Hughes, E. Peck, J. R. Macmurdo, B. D. Hasell, J. L. Taylor, M. S. Freeman, T. E. Walker, W. H. Halsey, C. W. Pardo, and others whose names were not obtained.

There were also present: Virgil Powers, General Commissioner; J. R. Ogden, Vice-Commissioner, and the Arbitrators, Messrs. John Screven, T. H. Carter and E. K. Sibley.

Mr. Virgil Powers, the General Commissioner, presented his annual report, which, in view of the fact that the form and methods of the Association must be radically changed under the act abolishing the pooling system, was largely devoted to a review of the operations of the Association under that system from its commencement, in 1873. The main facts in the history of the organization were very briefly presented. He showed that the strict maintenance of rates had resulted in reasonable revenue to the companies and general satisfaction to the people served. Almost the only complaints had arisen from cuts in the Western business which was not pooled, and to shipments from non-pooled territory into the section covered by the Association. A number of tables are appended showing business done and revenue derived, and a comparative table of rates for 12 years which shows a gradual reduction of 25 to 30 per cent. under the pooling system.

The President of the Association and the members of the Executive Committee were elected a committee to revise the agreement of the Association for the ensuing year.

The agreement as adopted is given at length, as important changes were necessarily made. It is to continue in force from August 1, 1887, to July 31, 1888.

AGREEMENT.

The preamble is that of the agreement of October 24, 1883, and sets forth as the object of the Association the establishment and maintenance of tariffs of uniform rates, and the prevention of unjust discrimination, but, of course, the "just and equitable division of business" can form no part of the new agreement.

The first four sections are like the old agreement. They

define the territory, provide for the annual convention and for the composition of the Executive Committee.

Fifth. This section provides for the meetings of the Executive Committee as formerly and continues thus: The Executive Committee shall have jurisdiction over all matters relating to the competitive traffic, but shall act only by unanimous consent of all its members. All the business from or to local stations of the roads comprising a system is local business to the controlling system. All business from or to a crossing or meeting point of two or more roads is competitive traffic. In event of failure to agree, the questions at issue shall be settled by the board of arbitration hereinafter provided for. But this shall not be construed to give the Executive Committee or the Commissioner any control over the local business of any company, even though such local business may of necessity pass through said crossing or meeting points of two or more railroads.

Sixth. For the mutual protection of the various interests and for the purpose of securing the greatest amount of net revenue to all of the companies parties to this agreement, it is agreed that what are termed Western lines shall protect the revenue derived from transportation by what are known as Eastern lines, so far as can be done by the exaction of local rates, and that Eastern lines shall in like manner protect like revenue of Western lines.

Seventh. The Executive Committee shall have the right, at their discretion, to appoint a rate committee and other sub-committees, either of their own number or from among the officers and agents of the companies members of the association, and to delegate to such sub-committees jurisdiction over such matters as may be specially committed to their charge. With a view of a proper relative adjustment of all rates, and especially a proper relative adjustment of rates on similar articles from the East and West to common territory, the rate committee herein provided for shall have sole authority to make all rates and classifications to and from all points East and West into association territory. But the sub-committees shall act only by unanimous consent, and, failing to agree, the questions at issue must be referred to the Executive Committee for settlement, or such questions may be submitted direct to the board of arbitration when so authorized by a majority of the Executive Committee.

The Commissioner shall be *ex-officio* chairman of all sub-committees, and as such shall be the medium of communication between the sub-committees and the Executive Committee. Absent members of sub-committees will be represented by the Commissioner, as in case of absent members of the Executive Committee. During the interim between the reference of any matter of difference from a sub-committee to the Executive Committee and the final determination of such matter the general commissioner, if it be a matter requiring prompt action, shall have authority to decide it temporarily, and his decision shall be binding on all parties until reversed by the Executive Committee or by arbitration.

Eighth. The following officers shall be elected at the annual meeting, and shall hold their offices until the next annual meeting and thereafter until their successors are elected: A President, a Secretary, a Commissioner, a Vice-Commissioner and three arbitrators.

The eighth and ninth sections specify the duties of the President and Secretary, which are not changed.

Eleventh The Commissioner shall be the chief executive officer of the association, and as the representative of its members, both severally and jointly, shall act for them in all matters which come within the jurisdiction of the association, in conformity with the requirements of this contract and the instructions of the several committees herein provided for, but exercising his discretion in all cases which are not provided for either by this general agreement or by the committees acting under its authority and sanction. The Commissioner shall also take charge of reports and claims, and appoint such clerks and claim agents as may be necessary, and charge up the expense to the roads interested in the business, on an equitable basis, managing the business for the benefit and at the cost of the companies interested. He shall also have authority, with the approval of the President, to reduce the rates when necessary to meet the competition of lines or roads not parties to this agreement, and he may at the same time make corresponding reductions from other points from which relative rates are made. He shall have such authority over the General Freight Agents and their subordinates and over the accounting departments of the parties hereto as may be necessary to enforce the terms of this contract relative to the maintenance of rates, and to require information relating to the traffic to be furnished to him in such form or manner as he may deem necessary. He shall have access, either in person or by deputy, to the books, papers, correspondence, etc., of any of the officers, agents or employés of the parties hereto that relete to the competitive freight traffic.

Twelfth. The board of arbitration shall hear and determine all questions which may be submitted to them under this agreement or by consent of the parties, and the decisions of the said board of arbitration shall be final and conclusive.

Thirteenth. The Commissioner shall keep full and accurate accounts of all traffic originating at, destined to, or passing through competitive points in which two or more parties to this agreement are interested, making reports of the same to all the members of the association.

The 14th and 15th sections provide for filling vacancies in elective offices, and for the disbursements by the Commissioner. They are not used.

Sixteenth. In order to provide for the prompt payment of any fines that may be assessed against any member of this Association for violating its rules, each company shall deposit with the General Commissioner an amount equivalent to five dollars for each mile of road operated by said company under the provisions of this agreement, or in cases where the company operates a water line, five dollars for each mile allowed as a prorating distance in the division of through rates; *provided* such amount shall not exceed in the aggregate the sum of five thousand dollars for any one company; but in all cases when fines are assessed the General Commissioner is hereby authorized to draw at sight on the parties against whom such fines are assessed for the full amount of said fines, and each company party to this agreement hereby binds itself to promptly pay such drafts, it being the intent and meaning of this section that the deposits herein provided shall not be diminished by reason of the payment of any fines that may be assessed against a company making each deposit.

Seventeenth. The Commissioner shall be furnished with copies of all manifests issued by the companies members of the Association for traffic originating at, destined to or passing through competitive points in which two or more parties to this agreement are interested, such copies to be forwarded at the time the shipments to which they appertain are made, and abstracts of all such manifests shall be furnished to the Commissioner at the expiration of each month. The tonnage books of every company in the Association shall be open at all times to the inspection of the Commissioner or such agents as he may from time to time appoint for the purpose of enabling him to get a complete record of all traffic shipped to or from points designated in this section.

Eighteenth. Copies of all rates that may be from time to time agreed upon or fixed in the manner provided shall be furnished promptly to the auditors and other officers of the parties to this contract, and they shall see that the rates received are in conformity therewith, and that no variations are made from such rates on manifests, by voucher or otherwise, except by authority of the Commissioner.

Nineteenth. When by reason of any actual difference in the rate or premium for insurance against marine risks any line is at a disadvantage in competing with any other water, or combined rail and water line, such inequality may be obviated by arrangement with the insurance companies, individually or collectively, by which the transportation line can assume or pay the difference between the premium or rate of insurance by its own line and that by the line of its competitor, and thus secure to shippers the same premium or rate of insurance by all lines. In cases of competition between all rail lines and water, or combined rail and water lines, the latter may assume the whole of the premiums or rates for insurance against marine risks, and bills of lading to this effect may be issued. It is, however, distinctly understood and agreed that no reduction of the established tariff rates, rebates, or considerations of any kind shall be given or offered to influence shippers or to secure their preference for any road or line.

Twentieth. The Executive Committee shall organize such a system for the rendition of tonnage and revenue reports of the joint traffic throughout the territory covered by the Association as shall enable the Commissioner to be at all times fully informed of the movements thereof and the observance of rates established therefor, in order that he may detect promptly any violation of rates and keep each company or line informed as to the action of the other companies or lines. For these purposes the Executive Committee at their discretion may appoint agents to examine the books of the members of the Association and inspectors of weights and classifications. The expense of such agents and inspectors shall be distributed among the members as hereinafter set forth. Tonnage and revenue statements shall be rendered monthly to each member of the Association, and also annually on May 31, in a report to be made by the Commissioner at the expiration of each year and distributed to the members at least two weeks before the annual meeting.

Twenty-first. All measures necessary to carry out the purpose of this agreement shall be taken jointly by the parties hereto or jointly by such of the parties as may be directly interested; and should any question arise upon which they cannot agree in relation to the terms of this contract, or to any matter arising hereunder, it shall be decided by arbitration, as hereinafter provided, it being one of the fundamental principles of this contract that no party shall take separate action in any matter affecting the interest of one or more of the other parties contrary to the spirit and intent of this contract, and that all differences relating to the establishment, adjustment and maintenance of rates upon the traffic covered by this contract shall be adjusted by arbitration

Twenty-second. Whenever rates have been fixed by the Rate Committee, the Commissioner, or the Executive Committee, or by arbitration, as set forth in section VII., there shall be no reduction from such rates without the consent of the Commissioner. No member of the Association shall reduce such rates, directly or indirectly, by any special rate, rebate or drawback, or by payment of commissions, or by reductions or manifests, or by combinations of local rates, or by rebilling, or by underbilling weights, or by any consideration in the way of free transportation, or in any manner or by any device whatsoever. It is distinctly understood and agreed that the maintenance of rates, as established under the rules of the Association, is of the very essence of this agreement. All case of violation shall be reported to the Commissioner, whose duty it shall be to check such violation if possible, and in case he cannot do so to call the executive committee together, who shall use their influence to have any offending member or members conform to the agreement and rules.

Whenever the Commissioner shall have reason to believe that the rates established by the Rate Committee are not being fully maintained by any line or company, member of this Association, it shall be his duty to make a full investigation of the facts in such case, and if in his judgment there has been any violation of this agreement on the part of any member or members of the Association he shall submit the evidence in such case to the Board of Arbitration; and if the Board of Arbitration shall find, after a full hearing of the case, that any member is guilty of violating this agreement it shall impose such penalties therefor as it may deem proper and necessary to secure the maintenance of the rates of this Association. The Commissioner shall enforce such penalties, making use of the fund provided for this purpose.

Any surplus over and above the amount that may be awarded by the Board of Arbitration to indemnify any members for losses sustained shall be applied to the payment of the expenses of the Association.

The Board of Arbitration shall from time to time make or amend rules of procedure for the trial of such cases, and the submission of arguments in cases referred to it for decision, as it may deem proper.

Sections 23 and 24 provide for a membership fee of $300 for general expenses, and authorize the executive committee to make new rules.

Twenty-fifth.—That a line from Buffalo, through Pittsburgh, Wheeling and Parkersburgh to Huntington, be made the dividing line between the Eastern and Western lines for territory hereinafter outlined; that the Western lines shall not make joint rates from points east of that line for any points east of a line drawn from Chattanooga, through Birmingham, Selma and Montgomery to Pensacola.

The Eastern lines, including the Richmond & Danville railroad via Strasburg, or points east of Strasburg, and the East Tennessee, Virginia & Georgia railway via Bristol, shall not make joint rates on traffic from points west of that line (Buffalo, etc.) to any points on or west of a line drawn from Chattanooga through Athens, Augusta and Macon to Live Oak, Florida.

The traffic from Buffalo, Pittsburgh, Wheeling, Parkersburgh and Huntington, and points on that line, to and east of Chattanooga, Calera and Selma shall be carried by either the Eastern or Western lines only at such rates as may be agreed upon.

Twenty-sixth. This contract, as amended, takes effect the 1st day of August, 1887, and shall terminate on the 31st day of July, 1888, and the fiscal year of the association shall terminate on the 31st day of May, 1888.

The agreement was adopted.

Officers were elected as follows:

President, Hon. J. E. Brown; *Commissioner*, Virgil Powers; *Vice-Commissioner*, James R. Ogden;

Secretry, Chas. A. Sindall;

Arbitrators, John Screven, T. H. Carter, and E. K. Sibley.

The Executive Committee is as follows:

East Tennessee, Virginia & Georgia, E. B. Thomas; Norfolk & Western, C. G. Eddy; Richmond & Danville, E. B. Thomas; Georgia Pacific, I. Y. Sage; Central Railroad of Georgia, General E. P. Alexander; Georgia & South Carolina Railroads, John B. Peck; Louisville & Nashville Railroad, E. B. Stahlman; Cincinnati, New Orleans & Texas Pacific, John C. Gault; Western & Atlantic, R. A. Anderson; Wilmington & Weldon, H. Walters; Nashville, Chattanooga & St. Louis, J. W. Thomas; Coastwise Steamship Association, Theo. G. Eger.

The Preservation of Ties and Timber by the use of Antiseptics.

What follows is a summary of a paper on this subject, by Mr. J. P. Card, of Chicago, which is published in the July number of the *Journal of the Association of Engineering Societies.* The author makes a very brief statement of the various well-known antiseptic processes, and then states that the chloride of zinc treatment has been abandoned in England. The unsatisfactory results he explains as follows:

If a tie was reasonably dry and in rock ballast, and it should rain, it would absorb moisture slowly as it rained; the flow would be inward, taking more or less of the salt with it, for the soluble salt will, to a certain extent, move around through the wood in whatever direction the moisture goes. When it rains, it goes inward or towards the centre; when the moisture evaporates, to the point of evaporation. I have had this tested by analysis to my entire satisfaction. If ties were submerged, or partially so, in water for any considerable time, the chloride, being of greater specific gravity than water, the tendency would be to go out of the ties rather than inward, or to equalize with the water surrounding them. Again, if the ties were in sand (like the Rock Island ties, which I will mention later on) the result would be, when your sand was moist or wet they would absorb moisture where they come in contact with it, and as it gradually moved to the point evaporation, which would be the top or exposed portion of the ties, it would carry with it more or less of the chloride. This constant, or at certain seasons of the year long-continued evaporation, weakens, in my opinion, the strength of the chloride at point of contact with the ground or moisture below the minimum of its preserving properties, and in the case of the Rock Island ties, which were in clean sand, they gradually decayed where they came in contact with the ground, but remained sound on top as a general thing. Again, should there be impurities in the ground or water surrounding the ties, or in rainfall, that would combine with the chloride or any salt and transform it into a non-antiseptic, as oxide of zinc, the change would be more or less rapid, and it is in this way that I account for the bad results with chloride of zinc in England, and from rainfall, if ties are on rock ballast.

I know of Burnettized gum wood ties that were placed in cinder and slack coal ballast in 1880 (the cinders and slack came from a coal mine dump that had been burned over), that were worthless in twelve months after being placed in the track, while ties treated at same time that were placed in sand, are sound to-day, or were, when I examined them last year. I don't mean to say that all cinders and slack will produce this result, but these did; neither do I wish to convey the idea that the changes mentioned heretofore occur in a day. Some of them may in a month, or as in the case of the Rock Island ties, their average life was over fifteen years. There is a section, or some twenty miles, of the Union Pacific where the ties have been preserved since the road was first built by the soil in which they lie.

If you inject a sufficient quantity of oil (of proper quality after steaming and vacuum) into ties, or timber, they will remain sound so long as the oil remains undisturbed, if it enters the wood but ⅛ in., or even less, on the sides of say, a 10 in. by 10 in. stick of timber, notwithstanding the oil remains practically where it is placed at time of treatment, and does not diffuse through the wood, like chloride of zinc, and for the following reasons:

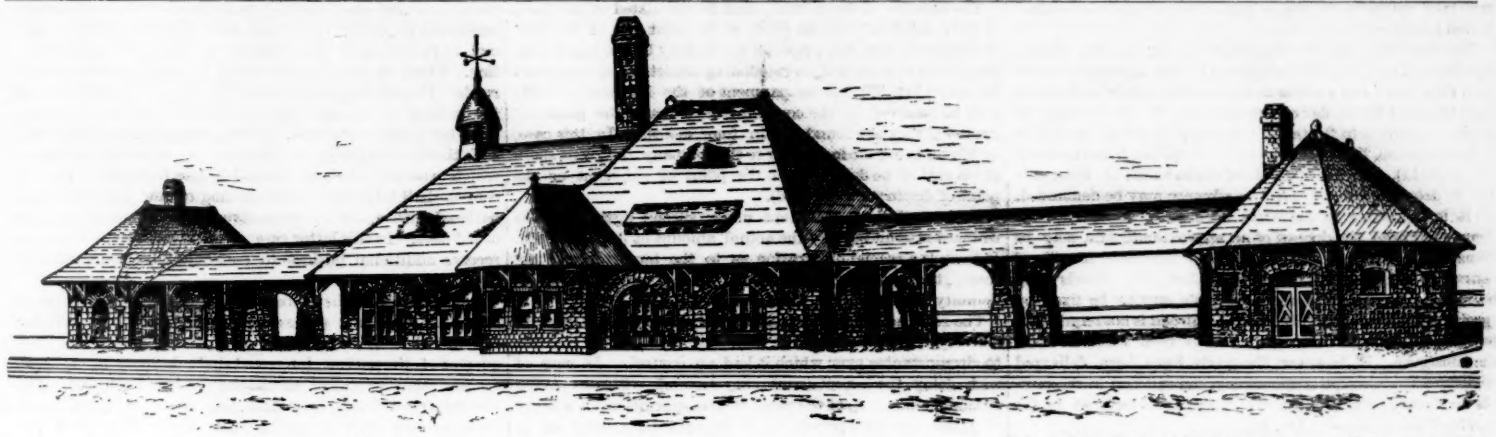
Dead oil contains carbolic and other acids, which are more or less soluble in water, and enough of these acids combine with the moisture in the wood at time of treatment to destroy the fermentable or other matter then in the wood, that tends to decay, and any impurities or germs that decay thereafter coming from the outside will have to pass through the dead oil, and in doing so, are destroyed or rendered inert. The trouble with creosoting is to get the dead oil where you want it (it will stay where you put it) and the cost. The trouble with a mineral salt, or chloride of zinc, is to keep it where you put it, or where it places itself shortly after treatment, if the work on your part is properly done.

Having given you my experience, as well as ideas, as to the benefits to be expected from the proper use of mineral salts and dead oil when used by themselves, I will now submit for your consideration and discussion before this society the process known as the "zinc creosote" process, which consists in the use of both dead oil and chloride of zinc in combination, for the preservation of railroad ties and timber from decay, as well as protection against the attacks of the toredo where timber is placed in the sea. For railroad ties, bridge timber, and the like, or where timber is subjected to no considerable moisture, as when placed on or in the ground, the process is as follows:

After preparing the timber in the usual way by steaming and vacuum, the dead oil is run into the cylinder, and such quantity as may be desired is forced into the wood. For railroad ties or timber I would recommend, say, ½ gallon to the cubic foot, or 1½ gallons to the tie. A less amount may be found to answer. After the timber has been treated with oil, the oil is removed and cylinder charged with chloride of zinc, when by pressure it can be made to enter the wood, pass through and beyond the oil, and impregnate by diffusion that portion of the wood that the oil will not penetrate, especially where timber is not well seasoned or dense like oak. The aim of this process is to get the benefit of the dead oil treatment where ties of timber come in contact with the ground or moisture with one-half or less oil, besides having those portions of the wood not penetrated by the oil impregnated with the zinc chloride. The zinc chloride, surrounded as it is by oil, should be protected for a long time in ties or bridge timber against moisture. I find that less than one half the quantity of oil used in ordinary creosoting can be distributed by this process through every portion of the wood penetrated by the greater quantity injected in the usual way.

Creosoting, as practiced abroad, unless a much larger quantity of oil is used on ties than in England (6 to 10 pounds to the cubic foot), foot), is of little value in my opinion, unless a chair is used under the rail to take the wear, for the following reasons:

Where dense woods are used (in fact it is the case with many of those considered porous) the heart wood will take the oil but skin deep, consequently the oil is in time worn off by the rail, decay commences and at the worst possible place the spike becomes loose and the tie valueless. This is probably the reason there were so few American creosoted ties exhibited at the Exhibition of Railway Appliances in 1883,



PASSENGER STATION, KALAMAZOO, MICHIGAN CENTRAL RAILROAD.

and the few there were had been treated to at least two gallons of oil to the cubic foot. If I am not correct I would ask what has become of the thousands that have been treated in the past thirty years in this country, where we use no chair? I have here one of a lot of ties treated by a Mr. Pelton some years since for the Chicago, Rock Island & Pacific Railway Co., and placed in their tracks near Englewood. It was taken up in May, 1883, for exhibit at Chicago Exposition of that year. These ties were treated by what is known as the Seely process, in 1872, and notwithstanding they contained but little oil (less than four pounds to the cubic foot), were sound so far as examined by me where they came in contact with the ground, but commenced to decay (so I was told) under the rail as soon as the oil wore off, and not before. If a sufficient quantity of oil is used to impregnate the ties to a considerable depth at point of contact with the rail (which means for oil, say fifty cents, or six gallons to the tie, and this applies only to soft woods and not to oak), a good result would be obtained; otherwise, a chair must be used. If you will show me one tie that has served a good purpose, I will convince you it was treated to at least six gallons of oil, or a chair had been used. Not but what a much less quantity would preserve it from decay if placed in the ground as a post and undisturbed, but should you remove the oil at the ground, it matters not to what extent, so the untreated timber is exposed, you will find your creosoting of little value, and this is the experience of all. Mr. J. W. Putnam, of New Orleans, in a letter of June 20, 1885, to the Chairman of the Committee on Preservation of Timber of the American Society of Civil Engineers, says: "With reference to creosoting, wherever the coating is broken and the air with its dust allowed to come in contact with the untreated wood, decay follows and extends in each direction from the opening," and he is but one of the many who make this or similar statements.

The Burnettized ties on the Chicago, Rock Island & Pacific Railway, near Englewood, and so far as I have examined those from other roads (where work was well done), were sound under the rail, but decayed where they came in contact with the ground.

Mr. Alexander, in his report of March 23, 1882, to Mr. Hugh Riddle, then President of the Rock Island road, says: "I made a careful examination of the Burnettized hemlock ties we laid in main track just west of Englewood in November, 1886, last summer, and found at least seventy-five per cent. of them still in the track and, in my opinion, in such a state of preservation that they will be serviceable for two or three years longer. Some five or six of these ties were taken out of track and found to be sound and solid in the centre and only decayed to the depth of one-half to three-quarters of an inch on the surface and sides. The rail has not worn into these hemlock ties to any greater extent than would have occurred with oak, and they hold a spike fully as well as the oak tie. The pine and cedar ties that were Burnettized at the same time have worn out in fifteen years' service, and have disappeared. The tamarack have held out about the same as the hemlock." Continuing he says: "My experience is that untreated hemlock ties decay first in the centre or heart, when the spike becomes loose and the tie crumbles; but these treated ties are sound in the centre, which shows that where the chloride of zinc is not washed out, the wood is in a perfect state of preservation." I saw these ties a short time after they were taken up, and examined those remaining in the track in June, 1883 (they had then been down over seventeen years), and found them to be sound under the rail with hardly an exception. I also had the sound wood from several of these ties analyzed, and found them to contain from .05 to .14 of one per cent. of chloride of zinc to weight of the wood when dry.

Again, in the same report (March 23, 1882), Mr. Alexander says: "In 1872 we laid in second track east of Washington Heights about 5,000 hemlock ties that were subjected to the creosoting process. These ties I do not believe were thoroughly treated. They seemed to be tolerably sound at the bottom, but are badly decayed on the surface, and the rail wears into them to a much greater extent than it does into those that were treated with chloride of zinc. There is probably not more than from 30 to 50 per cent. of these creosoted ties now in track, and these will, no doubt, all be taken out this summer." I examined these ties, or what there was left of them, in June, 1883, finding few then in the track, but was fortunate, however, in finding several hundred that had just been taken up and piled along the track. Nearly all of them showed results of which the creosoted tie exhibited here, which was one of them, is a fair sample.

If I am correct, what can be expected of creosoted ties with but 6 to 10 pounds of oil to the cubic foot if used as they are in this country in direct contact with the rail, and what must we do to get best results in the preservation of our ties? Use a chair as in England, or open porous woods and inject 50 to 75 cents worth of oil into each tie, or will a double treatment first with dead oil and then with chloride of zinc answer the purpose; the dead oil to preserve the outer or exposed parts which it will do, and the zinc chloride the central portions, which the oil does not penetrate to any considerable extent in our most desirable woods. So far as my observations and experiments go, I am satisfied that time will demonstrate that dead oil and chloride of zinc injected into ties and timber as proposed, will give the best results for money invested, and where dense woods are used, especially for ties, the best result, without regard to cost.

You may say that the old way of creosoting closed the pores, thereby keeping out moisture. Dead oil will not keep moisture in or out of wood like paint, tar or pitch for any considerable time. Moisture will not enter a creosoted tie above the surface of the water surrounding it, or without pressure; neither will it enter except under same conditions where the fibre is oiled. This being the case, your ties, under most conditions, will remain dry and the zinc chloride should be protected.

Again, you seldom see decay in wood the fibre of which has once been covered with dead oil, to such an extent as to be seen by the eye. The zinc creosote process will, as I said before, distribute one-half or less oil in every part penetrated by the greater quantity when injected in the old way, and in such quantities as can be readily seen.

You may say, would it not be better to first inject the chloride and then the dead oil? If the treatment were reversed, you would have to remove a portion of the moisture before the oil could be injected. Wood, being one of our best non-conductors of heat, the process would be tedious, and timber or ties would be more or less injured by the long continued application of the heat required to evaporate sufficient moisture. In fact, the only cheap and practical way would be to air, dry, or stack the timber until sufficient moisture has evaporated, and then apply the oil. I do not believe there would be anything gained by so doing, and it would add greatly to the cost.

With reference to the treatment of piling with dead oil as protection against the teredo: The old way is to inject all the oil the timber will take, from one to three gallons to the cubic foot. The object of the zinc creosote process is to economize in the quantity of oil used and nothing more, and consists in first injecting, say two-thirds (one-half may be found to answer) of the quantity used in the old way, and then by substituting some other fluid for the oil, as chloride of zinc, air or water by pressure, compress or force the two-thirds previously injected solidly to the centre, which leaves the two ends, the one in the mud or ground, the other above water, with their fibres virtually painted with the dead oil, while the centre of the pile or that portion in the water is as well treated and contains as much oil as would be the case if the whole quantity used had been oil. I would prefer an antiseptic for the second injection, as it would help to preserve that portion above water from decay.

Passenger Station, Kalamazoo, Michigan Central Railroad.

The exterior walls of the building are faced with Anderson pressed brick, and all jambs of arches, water table, etc., are of Lake Superior brown stone.

The roofs throughout are covered with red tile, and have terra cotta ridge rolls and cresting. The main entrance to the station on the south side has a porte cochere. The circular stairs adjoining lead to the conductors' room in second story.

The interior of the main waiting room is finished in quartered red oak. The ceiling is deep paneled and timbered. An elaborately paneled wainscoting, 4 ft. 6 in. high, runs round the walls. These are stucco plastered to the ceiling and fresco painted. The two large fire-places at the end walls are of pressed and molded brick and stone, with tile hearth and jambs. All upper sash is glazed with stained glass, and all clear glass is French plate.

The outbuildings, which are connected to the main building by 60 ft. covered walks, contain the telegraph office and men's toilet room, and the baggage room. The entire buildings are to be heated by hot water.

The architect was Mr. Cyrus L. W. Eidlitz, New York, and the contractors Bush & Patterson, of Kalamazoo.

International Traffic—The Berne Treaty.

The following is a summary of an international agreement with regard to railroad traffic, adopted after a long discussion by a conference held at Berne, in 1886, and signed by delegates from Belgium, France, Germany, Italy, Luxemburg, the Netherlands, Austria, Hungary, Russia and Switzerland; in other words, from all the leading states of continental Europe. It is interesting, not merely as a matter of history, but as the first and most important positive step toward the codification of the law of nations.

The agreement applies to all consignments from one country to another on a through bill of lading (Art. 1). This, however, does not include consignments which simply pass through a foreign country in transit to a destination in the country where they were originally shipped. It does not apply to goods of which the Post-Office claims a monopoly in any one of the countries who are parties to it, nor to objects whose size or character unfits them for transportation on the railroads of any of the individual states (Art. 2). Special arrangements are to be made by supplementary agreements limiting the transportation of dangerous or valuable goods (Art. 3). The joint tariffs agreed upon by the railroads separately are not affected by the agreement, but remain in force, except in so far as they contain provisions directly contrary to it, in which case they are null and void (Art. 4)

If the shipment is made in proper form the railroads are bound to accept it, except in special cases which make it physically impossible. The special rules regulating the receipt of goods at particular stations are not set aside, but, in general, goods must be forwarded in the order received. If the company fails to do this, and cannot show sufficient grounds for such failure, it is liable for damages (Art. 5).

The form of the bill of lading is accurately prescribed. We shall give a representation of it later. If the shipper does not indicate the route to be followed, the railroad is free to choose the way which seems most advantageous for the shipper; but, apart from a serious mistake in so doing, is not responsible for the consequences which may result from this choice. If the shipper has given directions as to the route, the railroad cannot send goods by another route unless the custom house examinations will occur at the same places, the tariff rate be no larger, and the time of transit no longer. The bill of lading must be made out in duplicate in the form prescribed. The companies may, however, in special circumstances require additional documents (Art. 6).

The shipper is responsible for any errors in the declarations of the bill of lading and the consequences which may result from them. The railroad has the right to verify the correctness of the statement in such form as may be permitted by law in the territory where such verification takes place. Unless this examination be the result of special police regulations, the owner shall be given the opportunity to be present at such verification. Subsequent agreements shall fix the penalty which may be demanded for false declarations over and above any special loss which the company may have sustained (Art. 7).

The transportation contract is closed the moment that the receiving station has accepted the merchandise for transportation, which is done by stamping and dating the bill of lading. The shipper has the right to demand that this be done at once. In the case of those goods loaded by the shipper himself, the declarations of the bill of lading do not in general furnish proof against the companies as to the amount of the contents. The receipt is acknowledged by the company to the shipper on a duplicate bill of lading (Art. 8).

The shipper is responsible for such special packing as may be necessary. If he does not pack the goods in the proper manner the railroad may refuse to carry them, or may demand special mention of the want, to be inserted in the bill of lading. In that case, the railroads are not responsible for loss which may result from these defects; otherwise, in the absence of such special mention, the shipper will be responsible only when the defect was a glaring one, or when he was guilty of intentional wrong (Art. 9).

The shipper is bound to furnish all papers which may be demanded by the custom house authorities on the route. The railroads are not responsible for errors in this respect. The railroads shall see that the custom house examination is properly performed. The owner has the right to be present in all these cases, and at the receiving station the consignee

may take charge of the whole matter of custom house examination (Art. 10).

The rate shall be calculated according to the tariffs. Special contracts are not recognized by the agreement; only such reductions and rebates as are publicly made and accessible to all under similar circumstances. No charge shall be made in addition to the tariff rate except such as is due to special expense, like that of cartage or custom house formalities (Art. 11). In case of goods of slight value, or those subject to deterioration, payment in advance may be demanded. If it is impossible to calculate accurately in advance the charge required, the deposit of an approximate sum may be demanded. If the price has not been thus paid, it will, of course, be charged to the consignee (Art. 12). Goods may be sent C. O. D., and rates for this service be fixed by special agreement. In this case the railroad is not required to pay the shipper until after the sum has been received from the consignee. If, however, the goods have been delivered without actual receipt of the money, the railroad is responsible for damage which the goods may have suffered in the hands of the consignee (Art. 13).

The shipper alone has the right to give orders with regard to the goods *en route*, and he cannot do it without producing the duplicate bill of lading. The orders must be transmitted through the receiving station. If a company obeys them without the authority of the duplicate bill of lading, it is responsible to the consignee for damages. When the merchandise has arrived at its destination, and the original bill of lading has been delivered to the consignee, the rights of the shipper cease, and from that moment the consignee alone has control. Directions given by the shipper at the proper time and in proper form must be obeyed unless they involve serious inconvenience to the railroad service. The company has, of course, a right to make additional charge for expense involved by the change (Art. 15). The railroad is bound to deliver the bill of lading to the consignee, with the goods, at their destination, on payment of the charges; and in like manner the company is authorized to demand payment of the charges on offering to deliver the goods and the bill of lading (Articles 16, 17).

If the transportation is interrupted by *vis major*, and transportation by an alternative route is impossible, the railroad shall demand new instructions from the shipper. The shipper may demand that the goods be returned; in which case, unless the interruption was due to the fault of the railroad, he shall pay the terminal expenses and a share of the movement expenses corresponding to the distance actually traversed (Art. 18).

The obligations connected with delivery are regulated by the law in force at that point. The delivering railroad is bound to collect all sums due to itself and to other railroads. For this purpose it has the rights of a creditor as long as the goods remain in its own hands or those of a third party acting as depositary (Articles 20-22.) The delivery of goods from one railroad to another creates an obligation. The credits resulting from this obligation are not subject to attachment, except after judgment rendered; nor can foreign rolling stock be made the object of attachment, except after judgment rendered in the courts of the state to which the company owning the rolling stock belongs (Art. 23).

In case of delay in delivery, the shipper shall be at once informed. In case of loss, partial or total, the railroads are bound to make investigations at once, and all parties interested shall have the right to demand immediately an investigation by proper legal authority (Articles 24, 25).

Rights of action against the railroad, arising from the transportation contract, belong to the person who has the right to give orders with regard to the goods. If the shipper is not in possession of the duplicate bill of lading he must have the authority of the consignee before bringing action. The company receiving goods for transportation with the bill of lading is responsible for the execution of the contract up to the point of delivery. Each subsequent railroad, in accepting the merchandise and the bill, participates in the contract and accepts the obligation. Action on the contract may be brought at the pleasure of the complainant against the first company that received the merchandise, or against the one that has last received it, or against the one on whose lines the loss was occasioned. The suit is brought under the laws of the domicile of the defendant company. Suit once brought, the right of choice ceases (Art. 27). Special complaints, however, apart from the main one, may be brought against other companies (Art. 28).

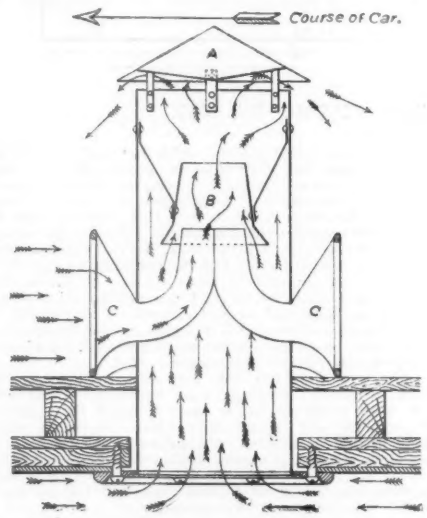
The company is responsible for the acts of its agents, regular or special. It is not responsible for errors arising from orders of the shipper acting with proper authority, except so far as a fault of the railroad may have created the necessity for such order; nor for loss due to the character of the goods themselves (Art. 30). The company is not responsible for losses inherent to the dangers of transportation in open cars, so far as such transportation may have been agreed to by the shipper or prescribed in the tariffs; nor for loss due to defective packing, as described in Article 9; nor for loss due to special methods of loading and unloading adopted by shipper or consignee; nor for loss on specially damagable goods; nor for the ordinary dangers incident to the transportation of live animals; nor for loss of goods and animals under escort. If, in the circumstances of the case, it seems probable that the loss may properly come under one of these heads, the burden of proof to the contrary shall rest on the complainant (Art. 31). Special regulations are to be provided for shrinkage or partial loss on certain classes of goods (Art. 32).

If the goods are not delivered within thirty days after the time fixed for delivery according to tariff regulations, the owner can without further proof treat the goods as lost (Art. 33).

The liability of the railroad shall be calculated on the basis of the market price of the goods at the point and at the time of shipment (Art. 34). Special tariffs may be arranged with reductions of rates and corresponding reductions of maximum liability (Art. 35). After payment of the indemnity, rights may be reserved by the complainant to have the goods delivered if they are found within four months. In this case, on his repaying the indemnity to the company, the goods shall, at his option, be delivered at the point of shipment or the point of destination (Art. 36).

In case of damage, except under special agreement, the railroad is bound to pay the actual amount of loss (Art. 37). If there is a special declaration as to the importance of delivery, the company may be bound to pay an additional indemnity (Art. 38).

The railroad is liable for damages occasioned by delays in delivery beyond the stated period, unless such delay was due to circumstances over which it had no control. In case of such delay the complainant can demand, without proving special damages, $\frac{1}{10}$ of the price of transportation for a delay of $\frac{1}{10}$ the stipulated period; $\frac{2}{10}$ of the price for a delay of $\frac{2}{10}$ of the period; $\frac{3}{10}$ of the price for a delay of $\frac{3}{10}$; $\frac{4}{10}$ of the price for a delay of $\frac{4}{10}$, and $\frac{5}{10}$ of the price for a delay of more than $\frac{4}{10}$. If there has been a declaration of special importance of delivery each of these amounts is doubled. On furnishing special proof of damage the complainant may demand a sum corresponding to such damage, but not to exceed the price of transportation in any case (Art. 40). In case of intentional wrong or serious negligence on the part of the railroads, the complainant can demand payment of the full value of the goods, with damages and interest, the latter to be counted at 6 per cent., beginning with the day of the complaint (Articles 41, 42). In no case is the company responsible for goods which have been received for transportation on account of wrong representations on the part of the shipper.



Enders' Saloon Ventilator.

Natchez, Jackson & Columbus Railroad.

The payment of the price of transportation and receipt of the goods by the consignee in general extinguish all right of action against the railroad. But this does not hold good when the complainant can furnish a proof of intentional wrong or serious negligence by the railroad; nor in case of complaints with regard to delivery, if made within seven days; nor in cases where the railroads have failed to bring important facts before the notice of the owner of the goods; nor in case of certain forms of damage not apparent on the outside. But such damage must be reported at once, and the complainant is bound to prove that such damage arose while the goods were in the hands of the railroad. As long as he suspects the existence of any damage, he may refuse to accept the delivery until the matter has been made the subject of investigation by authority (Art. 44).

Rights of action expire within a year, except in case of fraud or culpable negligence on the part of the company. Such rights expire within three years from date of delivery (Art. 45).

The railroad which has paid an indemnity has the right to demand reimbursement from the other companies that have taken part in the transportation, under the following provisions: 1. The company by whose fault the damage has been caused is the only one responsible. 2. If it has been due to the act of several companies, each one is responsible for the damage caused by its own error. If such a division is impossible the several companies are responsible, according to the share of the transportation charge which belongs to them. 3. If it cannot be proved that the damage has been caused by the fault of one railroad or of several, all the railroads shall pay their share, except those which can prove that the damage was not due to their fault. Should any one of the railroads be insolvent, its share of the damages shall be assessed *pro rata* among the solvent roads (Art. 47). The same general rule shall be applied in case of delay (Art. 48). The complaints of one railroad against another shall be made on the basis of the facts as determined in the original suit. The several railroads shall receive such notice as shall enable them to properly guard their interests in this original suit (Art. 50). Articles 51 to 56 deal with certain matters of international law arising out of the possible suits of the railroad against one another under this head.

A Central Office of International Transportation is established, charged, first, with receiving the communications of the contracting states and the railroad administrations interested, and to notify other states and administrations. Second, to publish facts and statistics of interest in this connection. Third, to act as an arbitrator in disputes between railroads. Fourth, to give form to demands for modification of the present agreement, and, if necessary, to make propositions for a new conference. Fifth, to facilitate as far as possible the financial relations between the different companies which arise out of international business (Art. 57). This, of course, shall take note of the opening of new lines for international service, and of the insolvency or other disadvantage of old ones. In this latter case no railroad shall be bound to receive additional business to pass over the delinquent line (Art. 58).

A conference of the representatives of the different states interested shall take place every three years, to provide for any necessary amendments of the present treaty. If one-quarter of the nations interested shall demand it, the conference shall be called at shorter periods (Art. 59). The present treaty binds the contracting states for three years from the day when it shall go into effect. It shall be the duty of every state that shall wish to withdraw at the end of such period to give one year's notice; without such notice the obligation shall continue for three years more. This convention is to be submitted for ratification at the earliest possible moment (Art. 60).

Additional agreements provide for an appropriation of 100,000 francs annually for the central office, to be assessed upon the different states in proportion to their mileage, for the publication of a journal which has been already begun, and for possible future service as a clearing house.

Still another supplementary document gives a list of articles which are excluded from transportation under the general agreement, such as precious metals and jewels, works of art, and explosive or dangerous goods. Of course these things can be transported by special agreement as before. A note to Article 14 provides that delays in delivery by fast freight shall not exceed one day for the receipt plus one day for every 250 kilometres or fraction thereof; and for slow freight shall not exceed two days for receipt, and two days for every 250 kilometres or fraction thereof. Supplementary delays are, however, allowed by a special agreement for market days, seasons of extraordinary traffic, or particular points, of ferriage, etc., involving special delay. A system of arbitrary rules is also adopted, by which the different companies share the loss due to slight delays in delivery. List of objects are given which are subject to shrinkage allowance; and there is a long appendix with regard to those objects which are only received for transportation under particular conditions.

In the final protocol of the Convention the delegates state that they take no action which should restrict the liberty of the several states in dealing with international commerce. They declare, however, at the same time, that the laws of their own states contain nothing out of harmony with the provisions of the treaty. This was drawn up at Berne on the 17th of July, 1886, but was not finally signed until the end of the year by the last of the delegates.

Enders' Saloon Ventilator.

The accompanying engraving represents a form of saloon ventilator devised by Mr. J. G. Enders, late Master Car Builder of the Natchez, Jackson & Columbus Railroad. Mr. Enders' tragic end is referred to in another column.

The principle of the device is somewhat similar to that of the Bell hopper ventilator, though Mr. Enders' device is placed on the roof instead of underneath the floor. It is placed at the top of the saloon in order to gather the foul air as it rises and hangs about the ceiling.

Notes in Oregon.

From an interesting letter in the *Evening Post* we make the following extracts:

"In the morning we were in the famous Willamette Valley. * * * The valley enjoys many advantages, and has excellent rail and water facilities of communication with the outside world. The river is navigable to a point 100 miles or more above Portland, and there are two lines of rail, one on each bank of the stream. The well-known law governing the growth of cities is happily exemplified in the natural location of Portland. It is easy of access and easy of defense; it possesses a salubrious climate and a fertile soil; it lies at the meeting point of the two great valleys of the Northwest, and it controls the trade of their rivers, the Columbia and the Willamette, with their numerous tributaries. Following the banks of these rivers, the railroads seek the city by water grades. No mountain barrier has to be climbed to bring the product of the grain fields to the warehouses of Portland. The level expanse of the Willamette Valley stretches away to the south, and the great gorge of the Columbia pierces the Cascades to the east. The Willamette Valley alone is capable, when fully settled, of supporting a city as large as Boston. Its area is almost exactly that of the state of Massachusetts, while, unlike that state, it has not an acre of sterile soil within its limits. Until six years ago the valley was the great grain-producing centre of the state. But of late years it has lost this distinction. Willamette wheat is still ranked first in quality, but in quantity it yields the palm to the great 'inland empire'—that vast wheat-growing region lying east of the Cascade Range, which is tributary to Portland through the gorge of the Columbia. For the crop year ending July 31, 1886, the Willamette Valley shipped 1,408,362 centals of wheat into Portland, and the 'inland empire' 4,444,747 centals.

"The city is now able to boast that it is the third richest in the world per capita. The present population of Portland and its suburbs is variously estimated at from 35,000 to 40,000. There are twenty-one business houses having a capital of $1,000,000 and upwards. Houses rented at $40,000 and upwards represent an investment of $3,700,000 upon the basis of the lowest rating in each case. A conservative estimate of the annual wholesale trade places it at $60,000,000. The aggregate capital of the banks is $6,742,514.

"For the crop year ending July 31, 1886, the gross exports, foreign and domestic, increased $3,956,189, as compared

with the previous year. Deep-sea tonnage, outward bound, increased 25,956 tons. The tonnage of the Oregon Railway & Navigation Company increased over 50 per cent.

"Portland's exports for the year were briefly as follows:

		Value.
Wheat, centals	5,321,496	$6,582,646
Flour, bbls.	541,632	2,013,585
Salmon, cases	577,497	2,521,402
Wool, pounds	14,100,718	2,411,920
Hops, pounds	4,916,879	356,575
Oats, centals	398,151	394,565
Miscellaneous		2,232,329
Total		$16,513,022

"The commerce of Portland, as I have shown, has assumed large proportions and is steadily on the increase. Home manufactures, however, have been neglected. There is a flour mill, with a capacity of 700 barrels per day, and a carriage factory is also in operation. The new reduction works now building are an important addition to Portland. The lumber industry is large. There are several planing mills and box factories and three breweries, several ship yards and machine shops. She city is the supply point of nearly the whole of Oregon. Situated within twelve miles of the confluence of the Willamette and the Columbia, it is easy of access by the residents of all sections, and goods may be transported either by rail or boat."

TECHNICAL.

Locomotive Building.

A new express passenger engine, the John H. Clifford, has just been built by the Rhode Island Locomotive Works for the Boston & Providence. Though a light engine, it is designed to handle a heavy train. The Clifford is of the ordinary American type, with cylinders 16 × 24 in., and drivers 68½ in. dia. The weight is 82,000 lbs; weight on drivers, 54,000 lbs. The engine wheel base is 20 ft. 11 in., and the wheel-base of engine and tender is 42 ft. The tank capacity of the tender is 2,750 gallons, and when loaded with coal and water the tender will weigh about 54,000 lbs. The boiler is constructed of the best Otis steel, is 50 in. dia., with extended arch, and has a fire-box 72 in. long. The chimney is straight. The slide valves are balanced, and the crank-pins, piston-rods, and driving-tires are Krupp's crucible steel. The Clifford is equipped with Westinghouse automatic brakes for engine, tender and train, and all the latest improvements.

The Rhode Island Locomotive Works have just completed a Forney type engine for the New York, Providence & Boston. This engine will be used in working suburban trains on the Pawtuxet Valley Branch. It has 15 × 20 cylinders, with 56-in. drivers, and is an anthracite coal burner, with straight chimney. The engine has a wheel base of 22 ft. 7 in., and weighs with tender 90,000 lbs. Its tank capacity is 1,700 gallons. The boiler is 44 in. in diameter and is of the best Otis steel, and the firebox is 66 in. long. The steam chest contains balance valves and the engine is supplied with Westinghouse automatic brakes. The boiler is lagged with asbestos. The chime whistle is used. The machine is expected to haul 15 loaded passenger cars over the steepest grade on the road at 30 miles an hour. As, however, the tractive power is comparatively small, only 80 lbs. per lb. average pressure on the pistons, it is difficult to understand why the engine is expected to haul so heavy a train up a grade of any magnitude.

The Atchison, Topeka & Santa Fe Railroad has ordered two of the Strong locomotives, a six coupled of the Schenectady Works, and a four coupled of the Hinkley Works, Boston.

The Car Shops.

The Maine Central has ordered four passenger cars from the Portland Company.

The Bradley Car-Works, of Worcester, Mass,, have delivered to the Providence, Warren & Bristol two passenger cars, with Mann roofs and other "modern improvements."

The Brooklyn Elevated has ordered 150 cars of the Gilbert Works, Troy, N. Y.

The Flint & Pere Marquette has just ordered 250 new freight cars.

The Atchison, Topeka & Santa Fe has ordered 1,800 box cars of the Indianapolis Car Works.

The extensive works of the Wells & French Co., car and bridge builders, at Chicago, were almost totally demolished by fire last Saturday morning. The loss foots up nearly $200,000. In addition to the damage by fire, the delay to work now in hand will be great. The plant will be repaired as rapidly as possible, in order that the large orders which are now on hand may be completed in time for delivery. This is the second heavy loss which Wells & French have suffered within the last two years, but in each instance the loss was fully covered by insurance. The only structures left standing were the car works, but the destruction of the engine-room and the machinery which furnished the motive power will interfere with them for some days.

The Terre Haute Car Works have been burned; loss, $150,000.

The Gadsden (Ala.) Car Company has begun work on its buildings.

The South Baltimore Car Co. has been organized at Baltimore, Md., and is building works at Curtis Bay, six miles from Baltimore, to have a capacity of from eight to twelve cars per day.

Bridge Notes.

The New Brunswick Railway is preparing plans for a bridge across the St. Johns River, at Fredericton, N. B. It will be of steel and iron, 2,365 ft. long. There will be eight spans of 250 ft. each, a draw span of 160 ft. near the Fredericton shore, and a final span of 205 ft.

The North Chicago Street Railroad Co. invites proposals until Aug. 15, for a steel swing bridge 220 feet long across the river at Wells Street, Chicago.

Manufacturing and Business.

The Rotary Steam Snow Shovel Co., of Paterson, N. J., has received orders for its steam snow shovels from the following roads: Four for the Northern Pacific; two for the Union Pacific, and one each for the Oregon Railway & Navigation Co., Central Pacific and Chicago, Burlington & Quincy.

The railway and electrical supply house of E. S. Greeley & Co., 5 Dey street, New York, successors to the well-known firm of L. G. Tillotson & Co., has lately been reorganized under the name of The E. S. Greely & Co. Messrs. Greeley and Parker still retain their interest and former positions in the management. Mr. W. M. Goodyear, in charge of the electrical department; Mr. Joseph Bailey, western sales department; Mr. E. S. Riggs, home office, railroad department, and Mr. J. W. Sands, accountant and cashier, are admitted as members of the corporation, and will retain the management of their respective divisions of the business.

Messrs. Riehle Bros., of the Philadelphia Scale and Testing Machine Works, report the following among their recent orders: Patent furnace charging scales for the Union Iron Company, Detroit, Isaac McHose & Sons, Norristown, Pa., and the Coalbrook Furnace, Lebanon, Pa.; self-adjusting-bearing railroad track scale for the Tidewater Steel Co., Chester, Pa.; a twenty ton hydraulic testing machine for Christiana Rolling Mill, Wilmington, Del.; a five ton cement testing machine, United States Engineers' Office, Buffalo; wagon scales for various parties and large orders from the United States Government for trucks and scales

The Pennsylvania Steel Co., of Steelton, Pa., have ordered 16 boilers of 240 horse-power each for their new steel works at Sparrow Point, near Baltimore, Md.

The officials of the Pullman Palace Car Co. have been examining a site offered it for the location of car works at Blair's Station, Pa., four miles from McKeesport.

Articles of Association for the Overhead Conductor Electric Railway Co. were filed in Pittsburgh, July 22. The company is formed for the purpose of purchasing, holding and selling of patent rights for electric railway purposes, with the right to issue licenses for the same and receive pay therefor. The capital stock is $300,000, and the stockholders are: George Westinghouse, Jr., John Caldwell, Herman H. Westinghouse, F. L. Pope, Thomas B. Kerr, Geo. H. Christy, Caleb H. Jackson and R. H. Whittlesey.

The Bessemer Rolling Mill Co., Birmingham, Ala., has ordered a 750 horse-power Porter-Hamilton engine from William Todd & Co., of Youngstown, Ohio.

The Glen Wire Manufacturing Co., of Cuyahoga Falls, O. manufacture iron and steel wire of all kinds, making tinned mattress, broom and lantern wire a specialty. The works are fitted up with new and improved machinery, and have a capacity of 5 tons of wire per day.

The Harlan & Hollingsworth Co. at Wilmington, Del., has contracted to build a steel schooner yacht from designs of A. Carey Smith for Chester W. Chapin, Vice Commodore of the Florida Yacht Club, of the following dimensions: Length over all, 132 ft.; beam, 27 ft.; depth, 10 ft.

The Wainwright Manufacturing Company, 65 and 67 Oliver street, Boston, report the following shipments of their corrugated tube exhaust feed-water heaters during the month of July: 3 to Waterbury, Conn.; 3 to Philadelphia, 2 to New York City, and 1 each to Gloversville, N. Y.; Middletown and Bridgeport, Conn., and Providence, R. I. Their expansion joints are also meeting with a ready sale, they having recently made shipments to Missouri, Colorado and Alabama.

Sebastian May & Co., engine lathe builders at Cincinnati, Ohio, have removed to their large four-story brick shop, just completed. This gives them much greater capacity, which their increasing business demanded.

Iron and Steel.

On July 27 the Carrie Furnace, at Braddock, Pa., was blown in after three months' shut down. One hundred and thirty men were put to work. The company have now 100 coke ovens in operation furnishing fuel for the furnace.

W. J. Hammond & Co., Limited, of the Pennsylvania Iron & Steel Works, have called a meeting of their creditors. The financial troubles of the company are directly caused by the recent fire. A large part of its liabilites, which are about $335,000, consist in the cost of the recent enlargements and improvements of the plant, and the fire of the 17th inst. has prevented it from realizing on this investment.

The Swindell Construction Co., of Pittsburgh, has closed a contract with the Pittsburgh Rustless Iron Works for the erection of a Bower-Barff rustless plant. The contract calls for the erection of an oxidizing furnace, annealing furnace, dregs, and, in fact, everything necessary for a complete plant.

The Cleveland City Forge & Iron Co., of Cleveland, has just turned out a shaft 16¾ in. in diameter and 25 ft. long, with six cranks, stroke 4½ ft., for the largest steel steamship on the lakes, now being constructed at Buffalo. The manufacture of this shaft required three months.

Exports of Locomotives.

There were 54 locomotives exported from the United States during the eleven months ending May 31, compared with 51 during the corresponding period of the preceding fiscal year.

Profitable Dining Cars.

It is generally believed that the dining car service on American roads is run at a loss, and that the system is kept up because its convenience adds popularity to the line. The losses on the various roads vary from $100 a car to $600 a car monthly. One Chicago line figured out last year that the expenditures of this branch of the service exceeded the receipts for the 12 months by $21,000. On the contrary, the dining car service to the Pennsylvania lines on its entire system in 1886 gave a net profit of $29, rather a close shave. The Chicago, Milwaukee & St. Paul and the Chicago & Grand Trunk both run their dining cars at a profit, although not a large one, and possibly other Chicago lines make both ends meet. A manager of one of the principal Chicago lines related to the reporter recently the manner in which he so arranged the dining car service on his road as to change it from a steady drain on the revenues to a source of profit. The previous year had shown a deficit of $16,000, and the dining car superintendent was certain that there was no possible method by which the loss could be averted. The manager thought different, and an excellent official with long experience on another road in this particular branch being out of a place, was sent for and a proposition made him. In brief, this was that he was to receive three times as much yearly salary as during his previous engagements, but this was coupled with the condition that all supplies were to be bought for cash, all commissions on purchases were to accrue to the company instead of to the superintendent, as had been the custom, and all moneys whatever or from any source received were to be turned over to the company, the latter reserving the right to discharge the official on a month's notice without explanation. In other words, he was given a salary that not only paid him to be honest, but inspired him with zeal in watching the interests of his line. The new departure has had a test of eleven months. In more than one direction the results have been a surprise. The dining cars have acquired a reputation of giving a better menu, better cooked, better served than almost any other Chicago line, while in place of a deficit the accounts show a profit to the company close on to $4,000. It is a pertinent question whether the same system carried out in other branches of the railway service would not bear equally good results.—*Chicago Times.*

Chime Whistle.

The chime locomotive whistle is much used on several New England roads, and has been lately fitted to an engine on the Boston & Albany.

The Accident to the President's Train.

The New York Railroad Commissioners have made the following report on the breakage of a parallel rod on the engine of the special train carrying President Cleveland and party over the Rome, Watertown & Ogdensburg, near Glendale, N. Y., July 16:

"At the time of the accident the train was running at the rate of from 35 to 40 miles per hour. The speed had been greater between Clayton and Lowville, but various circumstances to be alluded to seem to indicate that just previous to the accident the engineer had shut off steam and was preparing to slow down. His instructions from Superintendent Hammond previous to starting was to slow down and run with great care around curves and through stations. Just before the accident occurred the whistle was given for Style's Crossing, a highway about a mile north of Glendale. There was a curve ahead and the train had reached a heavy down grade, where it was customary to shut off steam.

"After the occurence John Perego, the fireman, who was thrown by the shock on to the coal bunker, went back into his cab, which was filled with escaping steam. He states that he found the steam shut off, except that the valve supplying steam to the air brake pump was on about half a turn. This he closed. At the first signal of danger Superintendent Hammond went into the car and tried to pull the valve setting the air brakes, but he found the brakes already set. The engineer had, therefore, shut off steam and had set the air brakes before or just as he left the seat. Westinghouse automatic brakes were on the car and tender. They were found to be strongly set when the train stopped, and had to be 'bled' in order to start the car again. This shows the brakes to have been in good working order."

"The locomotive in question was built at Schenectady, and was known as 'No. 1' and 'J. Bacon,' until the Rome, Watertown & Ogdensburg Company leased the Utica & Black River road. It was purchased by the old road about 10 years ago to replace a previous No. 1. It left the Oswego shops in March last thoroughly repaired, and has since been used in regular passenger service. The side rod that broke was of the usual hammered wrought iron variety, and measured 1⅝ by 3⅝ in. This gave it about the usual quantity of metal deemed most effective to resist breakage. The violent pounding and twisting to which the swinging piece was subjected after the break bent it nearly double without causing any further apparent crack in the fibre of the metal. This would seem to indicate that the metal was good. The exact condition of the place where the metal parted can only be ascertained by means of a careful examination. This the board proposes to have made in order that some light may be thrown upon the question of the breaking of side rods. So far as the board has thus far ascertained the accident seems to have been unavoidable, and to have arisen from no neglect of duty on the part of the corporation or of its officers or employés."

The Strong Locomotive.

This engine is to be tried on the New York, Lake Erie & Western.

The East River Tunnel.

The Legislature of 1885 granted a charter to the East River Tunnel Company, and articles of incorporation were filed with the Secretary of State. A reorganization of the company has taken place, which puts it in shape to go ahead with the work.

The Arthur Kill Bridge.

At Trenton, N. J., Aug. 1, Justice Bradley, of the United States Supreme Court, dissolved the injunction which had been granted at the instance of the Attorney General of New Jersey, deciding that the power of Congress to regulate interstate commerce is supreme, and that there are no circumstances in this case warranting any interference with that power. New Jersey's attorneys gave notice of appeal. Baltimore & Ohio officers say work on the bridge will now be vigorously prosecuted.

Plant for Reloading Bulk Grain.

The Baltimore & Ohio road is to build a transfer elevator on a new plan, to be located in its South Chicago yards. It will be 20 ft. wide, 40 ft. high and 100 ft. long. By means of shovels operated by a 50 horse-power engine the grain is to be unloaded from a car on one track and elevated into hopper scales, where it is weighed and immediately run by self-loading spouts into a car on the other track. It is expected that eight men—foreman, engineer, weighmaster and five laborers—can transfer and weigh 100 cars in ten hours. It is estimated that the cost of transfer will be only about 18 cents per car.

The Channel Tunnel.

The bill to allow the construction of a tunnel under the English Channel, which was reintroduced in the House of Commons by Sir Edward Watkins, was rejected, August 3, by a vote of 153 to 107.

Some Labor Notes.

Forty-four employés of the inside finishing department at the Pullman Company's Chicago works demanded the discharge of Foreman Sandstrom. Manager Sessions refused to comply, but notified the strikers that they would never be taken back if they took their time. After deliberating half a day on the situation the men went back.

Shipments of building material from Chicago to Omaha have been interfered with by the strikes of the building tradesmen.

The Milwaukee assemblies of the Knights of Labor have announced their intention of withdrawing from the order on account of the temperance plank in the new constitution.

It is reported from Oconto that the Knights of Labor are boycotting the Milwaukee, Lake Shore & Western Railroad Company for its refusal to reinstate two section men who had struck for higher pay.

There is an unusual scarcity of wage-workers in Fort Wayne. The brass foundry and machine works have asked the New York Commissioners of Emigration to send them a second lot of fifty helpers for their forges. The Pennington Machine Works have sent to Cincinnati for fifty machinists. The roadmasters and supervisors of railroads find their track work greatly embarrassed by the want of help, and the unusual amount of building and street paving is making demands for labor that cannot be supplied.

The Reading employés are reported still uneasy, and it is not yet certain that they will accept the system of tests of eyesight.

The Hocking Valley miners are out because of the refusal of the mine owners and operators to make semi-monthly payments as formerly, it being claimed that, owing to the depressed condition of the market and low prices, a continuance at the present time is a financial impossibility. The question at issue is not one that can be brought before the State Board of Arbitration. The notice of the district assembly, Knights of Labor, to the miners to resume work and test the new law if the operators refused semi-monthly payments has been wholly ignored, confirming former reports that the miners will no longer be governed by the Knights of Labor.

A misunderstanding has arisen between the Amalgamated Association of Iron and Steel Workers and the manufacturers. Already a number of mills in the Mahoning Valley have closed down, and nearly 5,000 iron workers are out of employment. The trouble is caused by an attempt on the part of the Amalgamated Association to enforce an old law in their constitution, which provides that no man shall hold two jobs at a mill. At the mills of Painter & Sons, Brown, Bonnell & Co., the Mahoning Valley Iron Company, and Cartwright, McCurdy & Co., of Youngstown, Ohio, the mill owners refused to discharge these men and the mills closed down Aug. 1. The same trouble is expected at the Solar Iron Works in Pittsburgh, and at the Iron Works at Akron, Ohio, and Girard, Pa. The manufacturers refuse to recognize the law, on the ground that it was not included in the agreement of the scale of wages they signed.

The Little Rolling Mill, the largest industry in East St. Louis, closed down July 29, on account of a strike among the stokers. The grievance is that too much work was expected of one man, Joseph Moon, who had been engaged as stoker. The proprietors of the rolling mill say they can close down for two weeks to advantage on account of having a surplus stock. Four hundred men are made idle by the action of the stokers.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

It apparently would be an advantage and the means of much profitable information if a president could be on every train that meets with an accident. The New York Commissioners have investigated the recent breakage of the engine of President Cleveland's special train on the Rome, Watertown & Ogdensburg, and made a report, printed in another column, which goes into particulars somewhat after the fashion of the English Board of Trade inspectors, and much more fully than is generally the case in accidents of similar consequence in this country. The report illustrates the fact that first accounts are almost sure to abound in inaccuracies, and the consequent difficulty of drawing conclusions from them. The making of such reports should not only be more common, but making them public should also be attended to, and not left to the taste of editors, friendly or unfriendly to certain interests. Probably mugwump and democratic papers will be much more likely to print the present report than those whose chief hero belongs to the Republican party. Every week, and oftener, fatal train accidents are reported where the cause if carefully ascertained and explained would prove a warning to superintendents all over the country; but the reports are generally amplified only in proportion to the number of persons killed, and then in a very superficial manner so far as causes are concerned. The causes are, to be sure, generally similar to those which have been met with before and are more or less fully understood. But the fact that they continue, unremedied, is worthy of note; and superintendents also desire to know the *frequency* with which the various kinds of failures happen. Numerous collisions have recently been reported as caused by "failure of air brakes;" what is wanted is some definite information as to how and why the brake failed (if it really did) so that the comparative probability of different kinds of failures can be estimated.

The breakage of the coupling rod on the President's train enforces a lesson as to the proper form of coupling rod to be used on fast passenger engines. The fact that the iron used is of excellent quality will not always compensate for faulty form. A large bridge built of plain rectangular bars would buckle and collapse under its own weight even though the iron were of the best quality. Similarly plain rectangular coupling rods whirled through the air at some 300 revolutions per minute, will occasionally break from the cross breaking strain caused by their own inertia. The obvious remedy is to use a form of rod that will best resist this cross breaking strain. The I section is the form best adapted for the purpose, and experience on the Pennsylvania and other roads shows that with this form of rod a complete immunity from fracture is secured. The rod in question had 6⅝ sq. in. area of cross section which was ample, if properly disposed in the form of an I section rod 5 in. deep, the web being about ½ in. thick, and the top and bottom flanges 2½ in. × 1 inch. Such a rod would be nearly double as strong against the cross breaking strain, and would weigh no more. The fact that the rod did not break when the engine was running at its highest speed is another illustration of the fact that good iron breaks slowly, and that though the original crack was started while the engine was running at a very high speed, the final fracture only took place some time later.

In some investigation of the action of rails under changes of external temperature, which are given elsewhere, the conclusion is reached that "careful instructions should be issued to plate-layers to slacken the fish-bolts on a hot day," and Col. Rich, who investigated an accident on the Great North of Scotland, attributed the buckling of the rails, which caused the accident, to the "excessive tightness of Ibbotson's patent fish-bolts, which prevented the rails from sliding between the fish-plates." It must happen very seldom indeed that fish plates hold the rails so tightly that the friction between the two prevents the lengthwise movement of the latter. Indeed, after considerable inquiry we have not heard of an authentic instance of such action, but it might well escape observation. Of all the numerous accidents that have been reported in the last few weeks not one has been attributed to the buckling of rails from expansion, but of the 42 unexplained derailments reported in our June accidents some may have been due to this cause. Without very good reasons to the contrary, it is much easier to believe that in the English accidents the rails which bent from increased length had crept together unobserved, than that the fish-plate held them. This seems the more probable, as on English track, with the "bull head" rail, there is no provision against creeping other than the friction of the rails in the chairs and at the joints. Supposing, however, it were established that rails may be held too tightly in the plates, and that precautions should be taken on hot days, when should trackmen be instructed to loosen the nuts? Professor Greenhill shows that if a rail is held absolutely immovable it will begin to buckle under a change of 4.6° F.; but there is hardly a day in the year in which the change of temperature is not more than this, and as for hot days, fluctuations of temperature are not confined to summer. The records of the Signal Service Office in this city for 14 months from June, 1886, to July, 1887, inclusive, show the mean difference between the highest and lowest temperature in the summer months to have been 31.5°, and the greatest difference was 39°, as observed in June, 1886. But in the three winter months the difference between highest and lowest observed temperature was: December, 40°; January, 66°, and February, 46.° The spring and fall months show greater fluctuations of temperature than the summer months, but less than the winter. It follows then that if the joint nuts are ever to be loosened it should be in winter; but it further follows that there should be longitudinal play in the joint all the time—a fact which American engineers long ago discovered. By the present American method of slotting the angle plates and spiking in the slots, each rail is, so far as expansion goes, made to a greater or less degree independent of all others, but were the effects of expansion to accumulate throughout the length of several rails, the bending due to the increase of length caused by a rise of 66° in temperature might be sufficient to seriously affect the gauge. The problem has been to keep the plates tight under the tremendous and quickly changing strains which they have to endure, and it seems imprudent to counsel fooling with the nuts as a remedy for a rather fanciful evil.

It is satisfactory to find that the committee appointed by an association of roads to consider the coupler question have come to the same conclusion as the Executive Committee of the Master Car-Builders' Association. When two independent bodies of experts concur in recommending the same type of coupler, the prospect of the adoption of interchangeable safety freight car couplers throughout the country becomes almost certain. It is to be hoped that the vote by letter ballot of the roads represented in the Master Car-Builders' Association will by a large and decisive majority confirm the conclusion arrived at by these committees. Such a decision will virtually settle the question, and save annually some hundreds of lives and much valuable property.

THE SOUTHERN RAILWAY AND STEAMSHIP ASSOCIATION.

This Association now enters on a new phase of its existence. Under the law, it is no longer an organization for the division of business, but it still stands as a means of maintaining rates, and securing equity and just dealing between the companies composing it. The history of the Association is an honorable and instructive part of the history of transportation. Whatever may be its future vicissitudes, whether or not events cause it to return to the original form and purpose, certain results will remain. The lessons of its career have been valuable to those who make the policy of railroads, and they have not been entirely lost on the public. Indeed, it is pretty safe to predict that they will become more obvious to the public and of greater value to it as time passes.

In September, 1873, a few Georgia roads, seeing the ruinous competition in which they were engaged, made an agreement to divide the business in the shipment of cotton out of Atlanta, and 15 months later a convention of representatives of Southern roads met at Macon and arranged for the division of cotton at the principal competitive points. In January, 1875, other meetings of the convention were held, at which a basis for the division of eastern merchandise to the principal competitive points was established and a general agreement for the transaction of business between the roads was adopted. This was a money pool. Lines getting more than their share of business received for the surplus carried one cent per ton per mile; the balance of the revenue from this surplus was paid to the lines not receiving their proportion of the business. Obviously, there was no inducement for the associated lines to seek to take more than their apportionment. At these meetings resolutions were adopted "against all kinds of bribery and corruption in the form of rebates and drawbacks," and pledging the members of the Association to "discontinue business relations with all railroad companies and individuals that shall continue these disreputable practices."

The lines represented at these preliminary conventions were said to have an aggregate capital of one hundred and five million dollars, and some 3,600 miles of main track, and included one steamship line. The railroads in the present membership of the Association have nearly 12,000 miles, and liabilities of something like 375 million dollars, and there are seven steamship lines.

In 1875 the Association established a clearing house to settle the through-traffic accounts, and it early fixed bases of classification and rates. Compliance with the terms of agreement was secured by charging local rates on freight carried for the offending road, or, finally, by declining to take its business. Nevertheless it was sometimes found difficult and even impossible to collect balances due in settlements, and in 1877 the plan was adopted by which each line deposited with the General Commissioner 20 per cent. of the revenue on each way-bill on all pooled business, and Mr. Powers states that since that time all balances have been paid, and rates thoroughly maintained, except for one month in 1878. Referring to the new agreement it will be seen that those violating its terms became liable to fines to be fixed by the Board of Arbitration, payment of which is secured by a special deposit. Further, the General Commissioner is authorized to draw at sight on the parties against whom fines are assessed in case the deposit to their credit is not sufficient. The specifications against *any* reduction of rates are very strict and precise. "It is distinctly understood and agreed that the maintenance of rates, as established under the rules of the Association is of the very essence of this agreement."

It is not to be supposed that the past history of the Association has been without tribulations, but such difficulties as have arisen have come mostly from unpooled business or from shipments coming in from non-pooled territory, or from looseness in the terms of agreement, and causes of complaint have gradually diminished. Mr. Virgil Powers, General Commissioner since 1876, states that "strict maintenance of rates has resulted in reasonable revenue to the lines and general satisfaction to the people served. There has been *no complaint as to discrimination between individuals in the same locality*, and very little, and that unreasonable, between localities. * * * This is evidence that the division of business system has benefited the people in this territory by giving them uniform and steady rates with gradual reductions thereof, instead of destructive competition, rates unsettled, rebates paid to the large to the great injury of smaller shippers, heavy losses of revenue to the roads and general dissatisfaction to the substantial business men of the country." He gives a table of rates on different classes, from New York, Boston, Philadelphi

and Baltimore to Atlanta (which were the controlling rates) for 13 years, to January, 1887, showing a gradual reduction of 25 or 30 per cent. General Alexander, in his little book "Railway Practice," quotes as a fair sample rate that on compressed cotton from Atlanta to New York. At the formation of the pool in 1875, this was $1.10 per 100 pounds, and it is now 75 cents. Similarly, a purely local rate, taken at random, that from Loachapoka, Ala., to Montgomery, Ala., shows cotton per 100 pounds in 1875, 33 cents, and in 1886, 24 cents, a decline of over 27 per cent.

The results secured by this voluntary Association have been those which the best legislation seeks, and more. They are: Economy and convenience in handling traffic, very great diminution if not entire abolition of discrimination, increased profit to the railroads, and reduced and steady rates to shippers. There has been the enormous moral advantage that the laws by which these results were attained were self-imposed by those whom they affected.

Under the new agreement there will come up this great difficulty: The longer lines, and those least favorably circumstanced will be able to secure a fair share of competitive business only through differential rates, and it is doubtful if rates can be maintained on such a basis. Rumors and suspicion of cutting rates have already arisen among the trunk lines. That the roads will generally try to live up to the new agreement is most probable. They know the cost of rate wars, not only in immediate loss of revenue, but in loss of public confidence; and they know the train of evils which follows. To them good faith is vital.

The future career of the Southern Railway & Steamship Association will be followed with great interest by students of railroad affairs; and it will undoubtedly be a powerful auxilliary to the Inter-state Commission in developing the science of traffic.

Some English Views of Subsidies.

We have before referred to the little flurry in the British Parliament over the subsidies for the Peninsular & Oriental Steamship Company, and the new line between Japan and the Western terminus of the Canadian Pacific. It was quickly terminated by the ratification of the Peninsular & Oriental's contract for 10 more years. Mr. Sutherland, the Chairman of the company, who is fortunately also a member of Parliament, "made a very lucid statement, showing that the company did not favor foreign producers, or use its power to injure other English shipping companies."

There was at the same time an understanding that the Canadian Pacific should also have its subsidy of £100,000 per annum; and the latest dispatches state that the English Government has decided to grant a subsidy, the amount of which is not named.

To Americans the interest of this event lies in the fact that both of the subsidized lines are competitors with our own transcontinental lines for the carriage of mails, passengers and freight. Moreover, the transcontinental mails pay a profit to our government; and it is estimated by Australians that between railroad fares and other expenditures each one of them passing through "the States" leaves here $500. The struggle of the Canadian Pacific for the Pacific trade has only begun and there may well be further demand for subsidies for Asiatic lines to the Canadian terminus. It is not out of place, then, to glance at the attitude of British writers toward the general questions of subsidies to British lines.

Mr. Henniker Heaton, a member of Parliament, who wishes to see penny postage between England and all of her colonies, in a communication to a recent number of *The Colonies and India*, reviews the principles governing England in the payment of those subsidies which have so largely aided to build up her splendid merchant marine.

Speaking of the post office, he says:

"Its primary object is to secure the safe and easy delivery of letters and parcels between persons, for the promotion of commerce, the increase of knowledge, the comfort of individuals and the safety of the State." And that "the deficit of £365,000 (annual), is due to the subsidies which are given to various lines of steamships which carry the mails. * * * It is necessary clearly to understand the nature and purpose of these subsidies. They are paid not for postal purposes, but for purposes quite distinct, though of great importance, that is to secure the commercial advantages of fast communication in peace and a reserve of cruisers in war." He says further, "Letters are now carried to Australia and New Zealand at a charge to the government of only 1d. per letter, in fast steamers not subsidized, yet in order to bolster up the subsidized steamers the government of England charges her people 6d. per letter. * * * The loss arises, not from the postal expenses, but from the subsidies paid to the companies. Those subsidies should not be charged to the post office, but to the Admiralty or the Board of Trade."

Mr. Heaton refers to a government report in which it was stated that the West Indian Packets, for instance, were established at a cost of £240,000 per annum, though the utmost return that was expected from letters was £40,000, leaving the £200,000 a clear deficit, and Lord Monteagle said of the struggle for the carrying trade of the North Atlantic, that it was not wise to allow the only rapid mode of communication between the British possessions in North America and the mother country to be dependent on the means afforded by the United States. Means were accordingly taken to establish a line of communication of their own. He admitted that this was not done except at a very heavy expense, but it was not right to place that expense to the account of the post office.

Mr. Heaton lays down the principle that

"After a new route has been opened for the extension of commerce, and sufficient time allowed for the experiment, the further continuing of the service, unless required for political purposes of adequate importance, shouldbe made to depend on its tendency to become self-supporting" and maintains "that for purely postal purposes subsidies are no longer needed: that if subsidies are paid they are for purposes other than the maintenance of postal communication. The objects for which they are given are of the utmost national importance, but the expenses incurred for naval or commercial purposes should not be brought forward as arguments against proposals for reform of the postal service."

In other words, subsidies should be employed as land grants were to our railroads, to open trade routes, and in that view the present payment of $85,000 to the Cunard company is about as defensible as a land grant to a railroad in Illinois would now be.

Lord Brassey, in the course of an interview at Adelaide, Australia, speaking of the Canadian Pacific, said that anything the mother country can now do to complete the link between Vancouver and these colonies or Hong Kong should be done, adding that France or Germany would, under like circumstances, undoubtedly give a subsidy for the encouragement of shipping. He proclaimed himself in favor of a generous policy in matters of subsidy for postal objects.

There is no question that this policy of our greatest commercial rival will affect seriously a certain part of our lines of traffic. What the counter move should be need not be discussed now. But it is well to realize that while Congress has striven to put a ball and chain on our own commerce (to borrow the phrase of General Alexander), that of the British Empire is borrowing wings.

International Traffic in Europe.

The passage of the Inter-state Commerce bill has brought before the public mind the question of international relations, as illustrated by the competition of the Canadian roads. Lawyers are inquiring whether there is any precedent for common action on the part of different governments in these matters. There are plenty of precedents of the sort, and it is only surprising that so little is known about them.

So large a part of European commerce is international that it has been made the subject of special agreements from the outset. Of late some of these agreements have been taking a more general form. Especially has this been the case with regard to matters of railroad liability. The first convention for this purpose met in 1878, but comparatively little was done in that year. There was a second conference in the latter part of 1881. The results of this conference would probably would have been accepted had it not been for the oppostion of Germany. But this opposition, though confined to a few points, was sufficient to make the whole movement, for the time being, fruitless. The necessity for some harmonious agreement was, however, that a third conference was proposed for 1885, and was finally called together in the summer of 1886. In this conference all the important states of Central Europe, from Russia at one extreme to France at the other, were represented, and, after some difficulty, a treaty was finally agreed upon and signed by the delegates of all the Powers. There ought to be little doubt of its ratification; and if this takes place it will be the most important single act in the whole history of international law.

It illustrates in the very strongest manner the influence which railroads have had on modern history. The time when each locality could settle its own affairs for itself has gone by. Modern industry has passed beyond the narrow bounds of former time, and modern political action is compelled to follow it. The same set of facts which has made Congress regulate inter-state commerce has made it necessary for Europe to regulate its commerce internationally. We are justified in expressing the hope that this may be but the beginning of closer international relations in other directions than this.

When so many people are lamenting the centralizing tendencies of modern industry, the lack of chance for industrial independence, the lack of personal acquaintance of producer and consumer, it is a satisfaction to see a case where the results of this tendency are so unquestionably good. The same set of industrial conditions which would make a war between different sections of the United States an impossibility to-day, must tend to lessen the frequency of wars between the different nations of Europe. A set of political relations as strained as are those to-day in the East would inevitably have led to a destructive war, had it not been for the intimate industrial relations which stand in the way of such a step. Anything which gives legal force and legal recognition to these trade relations between different states tends, so far as it goes, to increase the chance of harmony and diminish the relative importance of the conflicting interests even in politics itself.

This historical importance of the present agreement, and the intrinsic interest of some of its details, justify us in giving our readers a full summary of the contents of the document, which will be found in another column.

The Speed of Modern Steamers.

The introduction of higher pressures, compound engines and forced draught has made a considerable increase possible in the speed of steamships, and in several cases the rates of speed attained fully equal those of the through passenger trains on Western railroads.

The "New York," a new steamer lately placed on the Albany Day Line, attained a speed of about 24 miles per hour on a trial trip on July 13, when she ran from Twenty-second street to Yonkers, a distance of 14½ miles, in 36 minutes, making 28 revolutions with 40 lbs. pressure of steam. It is expected that when the bearings, etc., are worn smooth she will make from 30 to 31 revolutions per minute with 50 lbs. pressure.

The "New York" is built of iron by the Harlan & Hollingsworth Co., of Wilmington, Del. The engines were made by the W. & A. Fletcher Co., of New York, and have the usual walking-beam actuated by a cylinder 75 in. in diameter by 12 ft. stroke. Stevens' cut-off gear is used and a surface condenser has been substituted for the usual jet condenser. Paddle wheels 30 ft. 2 in. diameter outside buckets with twelve curved steel feathering buckets per wheel are used instead of the usual fixed wooden buckets. Each bucket is 45 in. wide by 12 ft. 6 in. long, and is stiffened by a 3 in. by 5 in. angle iron at the ends. The gain in speed and the absence of vibration are very noticeable.

Three return flue boilers, each 9¼ ft. diameter, 11 ft. width of front and 33 ft. long are worked with forced draught, at 50 lbs. pressure. The total grate surface is 228 sq. ft. The Williamson steam steerer is used.

The following comparison will show the advance made over the "Mary Powell," for many years considered the fastest boat on the Hudson. Many exaggerated stories have been told about her speed, but that given below is believed to be her correct average speed obtained by careful observation:

	Mary Powell.	New York.
Length water line, ft	286.	301
Beam molded, ft.	34.25	40
Draft water, ft.	6.0	6 0
Depth, ft.	.....	12.25
Displacement (tons)	800	.....
Tonnage	.....	1.552
Indicated horse-power	1,590	3,850
Speed (knots)	17.20	about 21

It will be seen that the indicated horse power of the "New York" is more than double that of the "Mary Powell," and hence the former's higher speed is evidently due to improvements in the engines and paddle wheels rather than in the form of the hull of the boat. The use of forced draught permits a comparatively small boiler to supply a large amount of steam and the combustion per sq. ft. of grate is probably as rapid as that on an ordinary anthracite burning locomotive.

Corresponding advances have been made in the speed of large paddle steamers plying in English waters. The "Queen Victoria" and the "Prince of Wales," the new paddle steamers built by Messrs. Elder for the Liverpool and Isle of Man service are fitted with unusually powerful engines, indicating 6,000 horse power. They are compound diagonal and direct acting, having two cylinders and surface condenser. The high pressure cylinder, 61 in. dia., is placed above the low pressure, which is 112 in. dia. The main working parts of the engines are made of steel, the shafts and crank pins being made hollow. The paddle arms and feathering floats are made of steel. The boilers are double ended and are supplied with forced draught. The fans are placed one on either side, over the boilers, and are driven by a small high speed engine situated between them.

The Queen Victoria made 24¼ knots per hour on her trial trip, and has since run from Ailsa Craig to the Cumbrae (24 knots) in one hour and 25 minutes, giving a speed of 22.6 knots or 26.1 miles per hour. Her sister ship has run from Greenock to Liverpool (about 240 miles) in 9 hours 23 minutes, giving an average speed of 22½ knots or 25.6 miles per hour. These boats are 340 ft. long, 39 ft. beam, and 24 ft. depth, the gross tonnage being 1,500 tons. It is stated that a rival company have contracted for even faster boats. The passenger traffic is considerable, especially in the summer, and very heavy weather has often to be encountered.

A new steamer, with triple expansion engines, the "Meteor" built on the Clyde by Messrs. J. & G. Thomson, has just run from London to Leith, wharf to wharf, in 27 hours 45 minutes. The run from Gravesend to Leith (475 nautical miles) was made at an average rate of 18.5 knots or 21.3 miles per

hour. As compared with her predecessor, the "Iona," which is of exactly the same form and dimensions, but fitted with ordinary compound engines, the "Meteor" is 1.2 knots per hour faster, her engines develop 50 per cent. more power though only 16 per cent. heavier, and owing to structural improvements her hull is 5 per cent. lighter. The saving in the weight of hull enables the heavier engines to be carried on the same draft of water.

The Cunard steamer "Umbria" has just made the fastest passage on record across the Atlantic having run from Queenstown to Sandy Hook in 6 days 4 hours 31 minutes. The actual distance traversed was 2,859 nautical miles, giving an average speed of 19¼ knots or nearly 22¼ miles per hour. The improvement in speed has been considerable of late years. In May, 1883, the "Alaska" made the passage in 6 days 23 hours 48 min., the first time the voyage had been accomplished under seven days. The "Umbria" has beaten this performance by about 2 knots per hour.

The fastest English armored ship is stated to be the "Undaunted," a belted cruiser. At a recent trial the engines under forced draught indicated 8,602 horse-power and propelled the ship at 19.4 knots. The "Undaunted" is 300 ft. long by 56 ft. beam, and was tried at load draft, 22 ft. amidships.

These speeds of large vessels conveying a considerable number of passengers and weight of cargo or a heavy armament may be compared with those attained by small steam launches or torpedo boats. The "Now Then," a steam yacht lately built by the Herreshoff Mfg. Co., of Bristol, R. I., for Mr. Norman L. Munro, of New York, is reported to be the fastest boat of that type on this side of the Atlantic. Her dimensions, etc., with those of two of the latest English torpedo boats, one built by Yarrow and the other by Thorneycroft, are given below:

	Now Then.	Thorneycroft.	Yarrow.
Length water line feet...	81	147.5	140
Beam " ...	10	14 5	14
Draft " ...	3.25	3.55	5.33
Displacement tons... ...	20	.....	100
Indicated horse power...	.....	.....	1,400
Speed knots.....over	19	26.00	24.964
" miles. .. ..over	22	30	nearly 29

The speed of the "Now Then" is taken from her performance on July 12, when she ran from Newport, R. I., to New York, in 7 hours 4 minutes. The distance is about 155 miles. The "Now Then" is fitted with triple expansion engines and with the peculiar form of safety boiler patented by Mr. Herreshoff, the well-known blind inventor. It will be noticed that the "Now Then" is considerably smaller than the English torpedo boats, and this probably accounts in great measure for the difference in speed.

The speed of the Thorneycroft and Yarrow torpedo boats was obtained at official trials on the measured mile. When tried on a two hours' run the Thorneycroft boat gave 24.9 knots per hour. Both boats were fitted with twin screws, compound engines, forced draught for the furnaces, etc. The Thorneycroft boat has water tube boilers, and the Yarrow boat locomotive type boilers.

The engines on these boats run at more than locomotive speed. The Yarrow boat made an average of 394 revolutions on the measured mile while the average boiler pressure was 151.8 lbs. The cylinders are 14½ in. and 24¼ in. diameter, with 15-in. stroke. The piston speed would therefore be 985 ft. per minute, or equal to that of an ordinary passenger locomotive running at 50 miles per hour.

The improvements made of late years in marine engines show no signs of finality, and it is probable that even higher speeds may soon be attained and that even the locomotive may have to look to its laurels.

Receiver McNulta has prepared a statement of earnings and operating expenses of the Wabash (east of the Mississippi) for the half year ending June 30, as compared with the same period last year. The results are shown in the following table:

	1887.	1886.
Gross Earnings.		
Freight.....	$2,083,279	$2,119,624
Passenger	688,362	647,816
Mails and other.....	239,090	242,858
Total.....	$3,050,731	$3,010,298
Operating Expenses.		
Conducting transportation.....	$750,364	$888,076
Motive power.....	585,365	700,791
Maintenance of way.....	469,982	504,585
Maintenance of cars.....	229 342	238,513
General expenses	69,975	91,979
Total expenses.....	$2,105,028	$2,423,944
Net earnings.....	$945,703	$586,354

The increase in net earnings is 61 per cent., while the increase of gross earnings is but 1.3 per cent. The comparison is made for the same mileage in each case, 948.2 miles. The reduction in operating expenses is extraordinary, and without further information than we have it is impossible to say whether or not it is not somewhat misleading. That is, the lines east of the Mississippi may have been charged under the old receivership with more than their just proportion of the expense of operating. The chief economies of this year have been in round figures wages and salaries, $126,000; advertising, $8,000; telegraph, $20,000; commissions, $14,000; hire of cars, $15,000; coal, $52,000; locomotive repairs, $15,000; legal expenses, $10,000, and receivership expenses $9,000. It is said that the Receiver will be able to pay another coupon Sept. 1 on the bonds on which a coupon was paid June 1.

The decision of Mr. Justice Bradley, dissolving the injunction which restrained the building of the Arthur Kill bridge, brings the Baltimore & Ohio so much nearer to the magnificent water front of Staten Island. Work has been but little delayed by the injunctions, as it has been carried on steadily on ground not in dispute. Mr. A. P. Boller is reported to have said that the masonry will be completed by the first of next December, and that it is expected to run trains over the bridge by June, 1888. Notwithstanding the long ferry from Staten Island to the Battery, the Baltimore & Ohio will have a great advantage, in that it will come to the water without passing through city streets. It seems probable, however, that the Pennsylvania will have its elevated tracks through Jersey City as soon as the Baltimore & Ohio gets to Staten Island: and in dock and warehouse facilities for freight the Pennsylvania will be no way behind.

A New Orleans dispatch states a shooting affray took place at the depot of the Natchez, Jackson & Columbus Railway between Master Car-Builder J. G. Enders and a discharged employé named Jos. Owens, which resulted in the death of both. An illustration and description of a recent invention of Mr. Enders will be found on another page, and others were shown in the *Railroad Gazette*, July 22. Such a tragic end to the life of a young, ambitious and promising railroad man is fortunately rare and calls for deep regret. Replying to a letter from the writer, Mr. Enders wrote a few weeks since:

"Your letter invites an acquaintanceship, so there will be no harm in my saying that I am a young man, *ambitious and thirsty* for as much mechanical knowledge as the calibre of my faculties will partake of. I want to move in the file of progress, but am anxious that my steps be only on meritorious footing."

The third conference of the Union for the Improvement of the Canals (New York) was held at Rochester last week. Resolutions were adopted in favor of doubling the length of the locks and deepening them; urging liberal appropriations from the Legislature; the appropriation of $100,000 to begin the work of deepening the canals to 7 ft. throughout, and the appointment of a committee to secure abolition of tolls on the Canadian canals for American business. A resolution to secure the aid of the general government was defeated.

Although the canals opened a week later than last year, the freight carried has been larger up to date than for the corresponding date any year since the canals were made free.

Lake rates are now the lowest thus far this season, 3 cents for wheat and 2¾ for corn Chicago to Buffalo having been accepted.

The fact that an electric head-light will render visible 23 telegraph poles, and in many cases more, is a very interesting one, but is of little practical use to those having to work railroads having numerous curves. The electric light furnishes no means by which a runner can see any distance ahead in a rock cutting on a curve, and a good semaphore distance signal worked by a trustworthy connection will still remain the best method of giving warning to an approaching train of danger ahead.

General Passenger Agent Ford, of the Pennsylvania Company, recently took his district and traveling agents on an excursion to Cresson Springs (in the Allegheny mountains), Philadelphia, Washington, Long Branch and other places which these men have been in the habit of urging other people to visit. President Roberts gave them a reception at Philadelphia. Such gatherings are without doubt profitable to a railroad, and deserve to be imitated by others. It seems a trifle absurd to say, as is done in this case, that some of the men had never before been over the line they work for.

In the article on the New York Elevated road in our last number, the perversity of a single word (in the third column, page 501) changed the sense of a dozen lines. It is the *engine* dispatcher, an officer whose office is at a terminal station and who can easily see every runner nearly every trip, who has the immediate supervision of the enginemen. He is generally, in fact almost necessarily, a promoted runner. The *Train* dispatcher, as understood on ordinary single track roads, is unknown on the elevated, the trainmasters attending to all train movements personally.

In Saratoga I saw a painter brushing out a wide red line on the station platform about 14 inches from the edge. He told me that the mark was designed as a place for the stopping of hackmen's toes. To step over it is to step into jail. If not restricted, their rivalry would lead to kidnapping travelers.—*Brooklyn Eagle.*

Most station masters would require some thickness, as well as length and width, in such a barrier. About 10 ft. high and 100 ft. long would be about right for the average hackman. And if the line were made of iron instead of paint, and colored by the process usually used for reddening that material, it might possibly protect the passengers.

Java and the Philippine Islands are among the sources from which the railroads of New Hampshire are destined to reap a rich traffic harvest, according to Mr. George F. Page, who recently argued before a legislative committee in favor of leasing the roads to the Boston & Maine, because it connects with the Canadian Pacific, which extends in the direction of those intimate neighbors of ours. The eloquent advocate did not descend to such trifling particulars as the amount or kind of traffic, or the profitableness of the rates it would afford.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Central Massachusetts, four miles from Ware, westward.

Chicago & Eastern Illinois, seven miles, completing the St. Louis division to Tuscola, Ill.

Georgia Midland & Gulf, seventy-four miles, completing the road to McDonough, Ga.

Minneapolis & St. Louis, eight miles west from Watertown, Dak.

New York Central & Hudson River.—Lewiston Branch extended to the Niagara River, 1½ miles.

This is a total of 94 miles for the week, making 2,642 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.
1887.....2,642	1883... ..2,796	1879.....1,273	1875..... 594
1886.....2,262	1882.....5,667	1878 947	1874..... 913
1885.....1,305	1881.. .. 3,115	1877..... 845	1873.....1,966
1884.....1,859	1880.... 2,631	1876.....1,145	1872... ..3,372

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

The Cardenas & Jucaro Railroad.

II.

CONSTRUCTION CONTRACTS.

Before giving a summary description of the lines I will briefly sketch the method of making contracts for construction. It may be well to state beforehand that railroad contractors are few in Cuba and that the existing ones are not of the highest financial standing. And thus it happens that no bond or security is exacted, reliance being placed mainly on their good faith and ability, though, of course, a contract is written out and signed. The contractor furnishes his presence and superintendence, tools and other incidentals. The railroad company makes a separate contract with a third party for the necessary workmen, which are supplied to the contractor. The company furnishes locomotives and cars for transportation of earth, men, etc., free of charge. Also all rails, ties, etc. The contractor is paid $.525 per cubic metre (about 37c. United States currency per cubic yard) of finished embankment or excavation as calculated from the data of the level book from the location survey. He is paid monthly for the work accomplished. From these payments are deducted the amounts due the labor contractor for the wages of the men furnished. These laborers receive about 50c. United States currency per day of 10 hours, and their food, which latter is generally estimated to cost 25c. per day. The labor contractor feeds the men. The contractor receives an extra allowance of $1,100 per kilometre (about $1,600 United States currency per mile) of track laid and ballasted. From 1½ to 2 cubic metres (2 to 2·6 cubic yards) of finished embankment are taken as the average day's work of one man in the prevailing heavy red loam almost wholly free from stones.

The 12.5 miles of road being built average 8,400 cu. yds. of earthwork per mile. The country traversed is relatively smooth and regular, yet there will be only three miles of level track; the remaining nine are on grades, the maximum being 40 ft. to the mile. The policy pursued by the road has been always to reduce the first cost to a minimum, irrespective of all other considerations.

COST OF CONSTRUCTION.

As a result, lines barely skim the surface, and in profile are sinuous indeed. New lines are at first laid, carelessly at that with worn rails taken out, perhaps, after 15 or 20 years' service from the main lines where steel rails have been substituted for them. This also tends to bring down the first cost, but the all enduring rolling stock complains bitterly as it is dragged along. The 12.5 miles now nearly completed are estimated to cost $11,000, United States currency, per mile exclusive of rolling stock and stations. The line from Sto. Domingo to La Esperanza, 13¾ miles, cost $23,000 per mile, exclusive of rolling stock and stations. It averaged 25,000 cu. yds. of earthwork per mile; it has a through single track iron bridge over the Sogua River of three spans of 84 ft. each, three deck trusses over small streams of 33 ft. span each, several high culverts and cuttings through sandstone. Its maximum grade is 53 ft. per mile and its ruling gradient 32 ft. per mile. It was laid with worn iron rails worth about $15 a ton. This line is the heaviest work the company has had, and relatively the least remunerative. Up to May 1, 1879, the company owned 175 miles of road which had cost $38,000 per mile, fully equipped.

It may be of interest to know in connection with the above data that in the statement presented to the Spanish Cortes by Dn. Miguel Martinez de Campos, a government engineer of high repute, in the matter of granting subsidies to the company which would undertake to build the Central R. R., he estimated the cost per mile to complete fully equipped road to vary from $25,000 to $40,000 per mile. The total cost of the 678 miles he places at about $20,000,000, or at about $30,000 per mile. No doubt railroads similar to the existing ones can be built in Cuba at that cost to-day.

TRACK AND STRUCTURES.

Generally grades on the lines do not exceed 24 or 30 ft. per mile. Frequently they fall below those figures. The heaviest ones are 52.8 ft. per mile and occur only between Jicotea and Esperanza. There are two such, one ascending 4,730 ft. long and the other descending 3,310 ft., with a level stretch of 3,838 ft. between them. Grades are usually short, but frequent. Roughly stated, fully 60 per cent. of the mileage is on a grade.

The majority of the curves have radii varying from 500 metres (1,640 ft.) to 2,000 m. (6,562 ft.); generally 1,000 m. (3,281 ft.) and 1,500 m. (4,921 ft.). There is one curve near Itabo with a radius of 3,400 m. (11,155 ft.). The junctions at Recreo, Macagua and Esperanza have radii of 200 m. (656 ft.). The curve at Montalvo, joining the C. & J. track with that of the Matanzas Co., is a compound one with three radii, 565 m. (1,854 ft.), 220 m. (722 ft.) and 175 m. (574 ft.).

It may be supposed that when first staked out these curves

were true ones; but to-day the broad statement that but few are endowed with less than half a dozen unequal radii is susceptible of justification. The practice prevails of allowing the bosses of the track gangs to adjust them by eye.

Steel rails are laid at the rate of about 24 k. (15 miles), or 1,500 tons a year. They are laid most actively during the summer and fall, the season of the heavy rains, but also that of least traffic and cheapest labor. Up to date 160 kilometres (100 miles), or about one-half the total mileage, are covered with steel rails. At stations and sidings the old iron rails are suffered to remain for economy's sake. The rails taken up are laid down in the new lines which are built.

There are 140 kilometres of stone ballasted road-bed. The ballast is hard limestone, broken to about 2 in. But little stone is to be found along the lines. It is purchased in Cardenas at about 35 cents a cubic yard, and transported to the point required and there broken by hand. The ballast is trimmed with vertical sides, built of large blocks. In some stretches of track the ballast has been carried up to a level with the tops of the rails. These details seem to be left very much to the fancy of the track foremen.

There are portions of the road where the nuts at the joints have been screwed on the outside of the rails, and the ballast carried up as stated above, thus rendering inspection of the condition of the nuts an impossibility. The ballast is given a depth of about 12 in. from base of rail. The sub-grade is not crowned. Where not stone ballasted the road-bed is mud ballasted. It was not crowned but carried up to the base of the rail, covering the ties, making a long trough, which, after a heavy rain becomes simply a flume, carrying the water down grade. The ditching is generally either absent or merely a pretense. Add to this old, very much battered iron rails, weak fish plates or chair joints, etc., and we reach the conclusion that there are stretches of track, which dwell in tranquil oblivion of the existance of any such desirable qualities as line, grade, surface or gauge. The stone ballasted, steel rail portions of the road are not in such condition. They are in good shape, and are being put in better shape every day.

Rails.—The old style of iron T-rail, still in use on about one-half of the mileage, is of the pear head pattern. It is $3\frac{13}{16}$ in. high, $2\frac{5}{16}$ in. across the head, with a $\frac{5}{8}$-in. web and 4-in. base. It weighs 62.5 lbs. per yd., and is in 24-ft. lengths. The new Bessemer steel T-rails come in 24-ft. lengths, weigh $63\frac{1}{2}$ lbs. per yd., are $4\frac{1}{8}$ in. high, $2\frac{3}{16}$ in. across the head, with a $4\frac{1}{4}$-in. base, and $\frac{9}{16}$-in. web, and a fishing angle of 23 degrees. The head has in the main a rectangular shape. The base has rounded sides. The upper corners of the head have a radius of $\frac{1}{16}$ in. These steel rails were at first purchased from Krupp, but of late years they have been bought from the Cockerill Association at Seraing, Belgium. They cost last year 112 francs per ton of 1,015 kilos in Belgium, and delivered at Cardenas, including all expenses, $30 (U. S. currency) per ton.

Joints.—The plain fish is used. The fish plate for the old iron rail is a light weak affair. The fish plate for the steel rails weigh $16\frac{1}{2}$ lbs. a pair. Still much too light, yet breakages under our light traffic are rare, though some have snapped in two from the strain due to expanding rails. This must occur only under very exceptional circumstances and with an already much weakened joint. There is no provision made to prevent the creeping of the rails. Galvanized spikes $\frac{9}{16}$ in. by $6\frac{1}{2}$ in. weighing $\frac{85}{100}$ lbs. each are used. Splices, bolts, etc., are furnished by the Cockerill Association at the same price per ton as rails, *i. e.*, about 1c. a lb., costing delivered here $1\frac{1}{2}$c. per lb. The quality is good.

There are different styles of joints in use on the lines. Some miles of the old wrought-iron lipped chair (see Trautwine's P. B., p. 767, fig. 14) joint are to be found yet. Thus we have the plain fish, both supported and suspended, opposite and staggered. Also occasionally the combination of fish plate and chair. These are being superseded by the suspended, staggered fish plate joint used with the steel rails.

All track iron is purchased at Seraing, Belgium, and there inspected by a Spanish engineer, commissioned by the company. The following is a specification of the tests to which 5 per cent. of the steel rails are subjected :

1. The rail placed, standing on its base, on two points of support 1.10 metres (43.31 in.) apart shall sustain during five minutes a central load of 12,000 kilos (26,400 lbs.) without deflection. (Probably means without permanent deflection.)

2. The same rail, in the same position, shall sustain during five minutes without rupturing a load of 36,000 kilos (79,200 lbs.).

3. Placed under the same conditions the rail shall resist, without rupture, the shock of a load of 300 kilos (660 lbs.) falling from a height of two metres (78.74 in.) on the centre of the rail midway between the points of support.

4. The resistance to rupture from tensile stress shall be from 60 to 65 kilos per square millimetre (85,140 lbs. per square in. to 92,235 lbs. per square in.) with a permanent elongation of from 18 per cent. to 22 per cent.

Spikes are tested by bending cold to an angle of 90 per cent. before galvanizing.

Ties.—Native hard heart woods are used. Some of these woods are very hard, having a specific gravity varying between 0.9 and 1.2. Ties have lasted 20 years in heavy red loam mud ballasts. Their usual life is from 8 to 10 years in mud and 15 years in stone ballast. The standard dimensions are $8\frac{1}{2}$ ft. × 9 in. × 7 in. They are spaced 2 ft. 5 in., centre to centre. They cost 60 cents a tie delivered at the company's stations. About 30,000 are consumed yearly for repairs.

Ballast.—The hard limestone found near the coast is used. It is broken by hand on the spot where it is to be used.

Embankments are given a width of 15 ft. at sub-grade, an excavations 17 ft. Parallel tracks are spaced 13 ft., centre to centre. The gauge is uniformly 1.435 metres (4 ft. $8\frac{1}{2}$ in.).

Culverts and Bridges.—There is nowhere to be found on the lines a masonry arch, culvert or bridge. The practice until a few years back had been to carry the retaining walls up to sub-grade and span the opening with timber beams, and wherever the spans became too large masonry pillars were thrown in. There are cases where there may be found fourteen or sixteen such pillars of massive ashlar masonry 4 and 5 ft. thick at top where a simple wooden truss or iron plate girders of 20 or 30 ft. span would have done better duty—mechanical and æsthetic—at much less cost. No wooden trusses of any description are to be found. No river worthy of the name had been met with till the Sagua and Hanabana had to be crossed. For these iron riveted pony trusses were purchased in Belgium, from the Cockerill Association, at 3 cents per pound at the works, and costing in Cardenas, all expenses paid, $4\frac{1}{4}$ cents a pound. The bridge over the Hanabana River has three spans—a central one 85 ft. and two side spans of 43 ft. The trusses are riveted and of the Howe type; total weight, 85 tons. The bridge over the Sagua River has three spans of 85 ft. each. The trusses are riveted work, and have ver ical posts and a single system of diagonals, with no counterbracing; total weight, 115 tons. This bridge is 10 per cent. lighter per running foot than the Hanabana, and was purchased later. They were designed by the manufacturer. The lower chords of the Sagua trusses are 40 ft. above the mean level of the river. For streams requiring an opening of 6 ft. or less, box culverts are used, with side walls of masonry and roof of the same material, supported by appropriate lengths of old rails. Five ft. is the minimum of filling between the top of the culvert and the sub-grade. For openings greater than 6 ft., open culverts spanned by plate girders, and for the larger sizes wrought iron trusses are the present practice.

Switches are, with the exception of three or four point ones, of the stub pattern, with the old time hoop stands. There has been until lately an astonishing uniformity in using 18 ft. moving rails, regardless of the radius of the turnout curve. Of late 24 ft. rails are being introduced which are more in accordance with the prevailing No. 8 frog used in sidings. The old cast-iron steel-faced frogs are being rapidly replaced by steel rail frogs made at the company's shops. They are of a decidedly weak type. The rails forming the tongue only are riveted together. The wing rails are merely spiked to the cross-ties. Beneath the point of the tongue there is laid a short, thin wrought iron plate with the edges turned up so as to grip the outer edges of the flanges of the wing rails. There is little need of dwelling on the lack of stability of such a combination. Yet many have been in the track for several years without any mishaps, but then the traffic is light and speeds slow. Guard rails are merely spiked, no knee braces being used.

At every station there are at least two sidings. These sidings vary in length from 1,000 ft. to 1,200 ft. each. Turntables are not used—instead, wherever traffic demands it, Y tracks are used for reversing trains.

The right of way is nowhere fenced in by the company; wherever fences do exist they have been erected by private parties for their own protection. Accidents from cows or bulls occur with some frequency. The right of way is given a total width of a cordel, equal to 66.75 ft., or one chain 9 in.

Stations.—The oldest ones of wood are ramshackle affairs and have been and are gradually being replaced by stone buildings. Of the wooden ones there still remain 10 out of a total of 33 stations. The older stone buildings have followed no fixed type, but may be briefly described as parallelopipeda crowned by a gable timber roof covered with red clay tiles, with a paved platform covered by a flat roof supported on stone columns, fronting on the track. They are made up of a roomy central hall, doing duty as a general waiting room without distinction of classes, flanked by rooms forming the ends of the building. One of these sets is used as a dwelling by the station agent and his family, for in Cuba the station agent lives in the station and has a family. The other set of rooms are used as ticket office, telegraph operators' office, baggage room, etc. These stone buildings are exceedingly solid, being built of ashlar masonry, with walls no less than 16 in. thick. The only building stone to be found on this part of the island, and the material out of which the vast majority of buildings are made, is a rather soft fossiliferous shell limestone. It is marketed in blocks measuring 36 in. × 24 in. × 18 in., Spanish measure (33.38 in. × $22\frac{1}{4}$ in. × 16.69 in. English measure) = 7.18 English cubic ft., at 35 cents a block. These blocks are the primary elements into which all stone structures built here may be resolved. These standard dimensions are antediluvian, and the least change in them must be paid for at a high price—such is the inertia of habit. Many of the stations have been made large enough to accommodate the track repair gangs, made up of ten men and a boss, and covering ten kilometres of track, which is also the average distance between stations. Track laborers are paid 55 cents (U. S. currency) per day of 10 hours. They must feed themselves out of that amount. In many instances separate dwellings have been provided for the track gangs.

The standard building for stations adopted of late years consists of a rectangular structure of ashlar masonry (83 ft. × 26 ft. × 21 ft.), with a salient portico (45 ft. × 13 ft.) supported by four round stone columns, and covering the central portion of a paved platform (170 ft. × 13 ft.) running parallel to the main track, its outer edge being 5 ft. distant from the centre of said track. The building is divided in two by a central waiting room ($23\frac{1}{4}$ ft. × 17 ft.), which is entered from the platform by an arched doorway (7 ft. × 12 ft.). On one side of this waiting-room are the ticket-office, baggage-room and dwelling rooms for the station hands, and on the other side the dwelling rooms for the station agents. The windows are 4 ft. × 8 ft., the outer walls 16 in. thick, and the partition walls 8 in. The material employed is the limestone already referred to. The roof is flat, being made of old 24 in. iron rails laid from wall to wall. Tiles rest on the lower flanges between the rails, the spaces up to the rail heads being filled in with cement concrete made of cement and limestone gravel. On this a paving of tiles is laid. The rails are placed 1 ft. $2\frac{1}{2}$ in. centre to centre. The thickness of the roofing from under side of rail base to upper surface of upper layer of tiles is $6\frac{1}{4}$ in. The old rails used are $3\frac{13}{16}$ in. high. The baked, unglazed clay tiles measure 13 in. × 8 in. × $\frac{5}{8}$ in. The whole roof is given a cant of 1 in 70 to shed the rain water. Opposite the passenger depot and separated from it by the main line and sidings is located the freight depot. The building consists of a single hall 83 ft. × 26 ft. × 21 ft. The longitudinal walls are each pierced by three openings (7 ft. × 11 ft.), 27 ft. c. to c., and provided with inner sliding doors of wood. The sills of these doors are 4 ft. above the level of the rails. From one end of the building there extends a raised (4 ft. high) platform 83 ft. × 26 ft., for the reception of sugar and molasses hogsheads. A door (7 ft. × 11 ft.) opens at one end of the building on the platform. These platforms are made of a wall 4 ft. high of limestone blocks inclosing a rectangle filled in with limestone gravel. The upper surface of this soft gravel makes a delicious mud with the tricklings from the molasses hogsheads. Pigs relish it. The roof of the warehouse is similar to that of the depot. Such a set of buildings costs about $7,500. Y. POLLEDO.

CARDENAS, May 28, 1887.

THE SCRAP HEAP.

Captain Payne, who has just finished the survey of the road between LaCrosse and Americus, ran upon a queer old customer the other day. We print below a verbatim report of the conversation:

"Layn' eout another railroad?" "Surveying for one," was the reply. "Goin' through my barn?" "Don't see how we can avoid it." "Wall, now, mister, I calcerlate I've got somethin' ter say 'bout that. I want you to understan' thet I've got suthin' else tew dew besides run out tew open and shet them doors everytime a train wants tew go through."—*Marion, Ga., Patriot.*

Stoves Are Now Prohibited.

A contemporary states that "the use of stoves in railroad cars is now prohibited by law in this state." It might be thought that even a Long Island brakeman would know better than to light a fire this weather. Our contemporary cannot refer to the law recently signed by the Governor which only comes into operation May 1, 1888.

A New Mania.

The controversy in the Paris press about the proposed Eiffel tower at the Paris Exposition of 1889 has enriched the French language by another and a very long word, which certainly stamps its inventor a genius. The word, first used in the *Moniteur Industriel*, is "troiscentmètretourimanie;" Anglicè, "three-hundred-metre-tower-building mania."

Can't Flirt Under the Law.

The Delaware & Hudson Canal Company, so reports go, has issued an order to the engineers and firemen in its employ "not to flirt while on duty under pain of dismissal." Little by little the far reaching and remorseless nature of that Inter-state Commerce act is coming to be understood.

Rivalry in Wheat Transport.

Although the recent corner in wheat in Chicago led to large purchases of Russian corn, and thereby temporarily inflated a branch of trade which had been for several years in an extremely d pressed condition, the Russian Government is fully aware that the relief is only of a temporary character, and that permanent improvement must depend upon the quickening and cheapening of transport. Statistics just published at St. Petersburg show that the cost of transporting wheat from Samara (the Russian Chicago) to St. Petersburg is 42 to 70 copecks the pood, and from St. Petersburg to London 10 copecks more, making a total of from 42 to 80 copecks, as compared with $28\frac{1}{2}$ copecks the pood which Indian wheat has to pay from the Punjab to the Thames, and 20 copecks the pood from Chicago to the same destination. In this manner the Russian merchant sending wheat to London has to pay more than twice as much as the British merchant in India, and nearly three times as much as his Transatlantic rival; Russian wheat, at the same time, costing more to produce than the wheat grown by the ryot in the Punjab. Under these circumstances the wheat trade of Russia labors under serious disadvantages, and it is not easy to see how they can be quickly remedied in the northern and Volga districts. The Russian Minister of Ways of Communication has under investigation the establishment of elevators at every grain centre along the Volga and the use of steam on the canals. The former would involve the expenditure of c nsiderable capital, and up to now the Minister of Ways of Communication has been obstinately opposed to any extensive use of steam power along the Neva-Volga canal system.—*Engineering.*

Railroad Taxes.

The State Comptroller of New Jersey has just paid into the Jersey City Treasury $250,000 collected by the State on account of local railroad taxes. The State collects the moneys due the several municipalities for railroad taxes, and then pays them into the local treasuries. The moneys heretofore collected have, however, been held by the State pending litigation as to the act under which the taxes are imposed.

A Nice Curve to Run Round.

A belt line— A girl's waist.—*Harper's Bazar.*

A Successful Car Coupler.

The Cleveland *Press* calls the attention of all interested in improved railroad appliances to an Ohio minister who recently married three couples in a railroad train. It regards him as the most successful car coupler yet invented.

An Embezzler Captured by the American Surety Company.

In September, 1886, the American Surety Company of New York issued its bond for $5,000 to the Canadian Pacific Railway Company on Clarence P. Dixon, agent of that corporation at Portland, Oregon. Dixon had a good position and was receiving $1,200 per annum salary, but he thought that the accumulation of a competency was too slow by honest methods, and therefore embezzled $1,929.07 of the railroad company's funds, and took refuge in Victoria, British Columbia. The American Surety Company secured his

indictment soon after at Portland, Oregon, and set about effecting his capture, which was done after eight months, and he was safely lodged in jail at Portland, Oregon, to await trial. He was arraigned for trial July 7, pleaded guilty, and was sentenced to three years' imprisonment in the Oregon State prison. This is the third absconder to Canadian territory prosecuted through the efforts of the American Surety Company.

Railroad Taxes in Indiana.

The State Board of Equalization has completed its assessment of the railroads of the state. The total is $62,092,439, nearly seven millions larger than for the previous year.

Immigration.

The total number of immigrants arrived at the ports of the United States and from the principal foreign countries, except from the Dominion of Canada and Mexico, during the twelve months ending June 30, as compared with the preceding year, was as follows:

Countries.	12 mos. ending June 30. 1887.	1886.
Great Britain and Ireland:		
England and Wales	74,020	50 161
Ireland	68 130	49,196
Scotland	18,633	12,114
Total	160.783	111.471
Germany	106,559	83,775
France	5,034	3,308
Austria	20,328	11,888
Bohemia and Hungary	19,807	16.734
Russia, Finland and Poland	36,887	21,706
Sweden and Norway	58,741	39,681
Denmark	8,500	6,172
Netherlands	4,506	2,314
Italy	47,524	21.503
Switzerland	5.213	4,805
All other countries	9,234	5,536
Total	483,116	328,895

Watermelons by Rail.

The fact that a special train of 15 cars loaded with watermelons was made up at Valdosta, Ga., the other day and shipped direct to Boston, all rail, is a new feature in the melon trade. Watermelons have been coming to Boston from Georgia for a long time, but they have always come by steamer till this year, except on one occasion, the sinking of the Gate City, when a special train loaded with melons was received in Boston. But yesterday the 15 cars from Valdosta, which is about 100 miles below Savannah, came to hand. They had been only 80 hours to Boston, much quicker than they have even been received by steamer. The occasion of shipping melons by special train to Boston seems to have been looked upon as an event in the history of the town The citizens all turned out. The cars were placarded with big letters announcing that they were loaded with watermelons, a special train en route to Boston consigned to Chapin Bros.; shippers, J. A. Dasher, J. C. Hunt, H. B. Powell. These placards were kept on the sides of the cars all the route. The receivers of the melons, who were taking them out yesterday, figure that they get about 1,000 sound melons out of a car, much better than the average is where the melons come by rail to Savannah and thence to Boston by steamer. The freight in this case is also costing less, and altogether the chances are that a new epoch in the history of shipping watermelons from Georgia has taken place.—*Boston Herald.*

From Calais to Constantinople.

The railroad between Nish and Pirot is finished, completing the line of direct railroad communication between Calais and Constantinople.

Freight Car Thieves.

On the Susquehanna Division of the Delaware & Hudson several brakemen have been arrested for plundering freight cars. It is said that thefts have been carried on for a year. The seals were broken and cars entered while on side tracks.

A Rival to the Watermelon Traffic.

Ten car-loads of tomatoes a day are being shipped to the North and Northwest from Crystal Springs, Copiah County, Miss.

Shotguns but not Train Robbers.

An Oregon paper says: The regular train on the Port'and & Willamette Valley road was detained an hour and a half yesterday near Middleton, Washington County, by a man and two boys with shotguns. The assailants were Charles Sandstone, a tailor of Portland, and his two sons. Sandstone owns a piece of land near Middleton, through which the railroad runs. He claims that he was never compensated for the right of way, and declared several times recently that no train should be permitted to run through his land. This afternoon as the train was coming to Portland the engineer discovered a rail missing, and of course immediately stopped. On dismounting, the conductor, engineer and mail agent were greeted with the muzzles of double-barreled shotguns in the hands of Sandstone and his sons. After considerable parleying Sandstone was induced to replace the rail and allow the train to proceed this time. He, however, declared that no train should run to-morrow, and as soon as the train to-day passed down he again tore up the track.

Storm in the South.

All the roads running into Atlanta, Ga., were more or less injured by heavy rains last week, several of them having serious washouts and two trains being derailed.

Fire at the Stock Yards, Chicago.

The immense beef house of Armour & Co., at the Union Stock Yards, Chicago, was burned to the ground July 27. The loss is about $300,000.

The Punch Photograph.

Much complaint has been made in consequence of the introduction of a new ticket system on overland roads to California. The trouble all arises from the fact that the ticket given at the Missouri River contains what is called a "punch photograph" of the holder. This is supposed to be a complete description of the passenger. Along the margin of the ticket is printed, in a straight column, the following words in small, black type:

Male—Female.
Slim—Medium—Stout.
Young—Middle-aged—Elderly.
Eye. Light—Dark.
Hair. Light—Dark.
Beard. Mustache—Chin—Side—None.

The passenger is photographed on the ticket bearing his signature by punching out all the words that are not descriptive of him. If for a male, the word "female" is cut out by the punch; if he is slim, the words "medium" and "stout" are punched; if his eyes are light, the word "dark" is stricken out; and if he wears no beard, the word "none" is left standing, while "mustache," "chin" and "side" are punched. Now, it is readily seen how a train agent passing hurriedly through a crowded car is likely to make errors in describing his passengers on their tickets, and so far from being a "photograph" of the holder, the marginal sketch often becomes a rank caricature. Even where the punch-marks faithfully portray the features and figure, the female passenger cannot always preserve her good temper on looking at the picture drawn for her. A well-developed lady of an uncertain age is not likely to consider it a compliment to be labeled in cold tipe as "stout" and "elderly." Tourist passengers on the overland trains often derive great amusement from a comparison of notes, or, rather, of tickets, but their fun is turned to disgust when they are told that they cannot secure return passage on the tickts when they have been wrongly portrayed by the train agent.—*San Francisco Chronicle.*

An Alcoholic Boycott.

The Achison, Topeka & Santa Fe has issued a circular giving notice to all whom it may concern that no spirituous, vinous or malt liquors, even for mechanical, culinary, sacramental and sacerdotal purposes, will be received for In-Territory points.

Car Works Burned.

The Terre Haute (Ind.) Car Works, with the exception of the foundry department, were destroyed by fire on July 18. Loss, $100,000; insurance, $50,000. Seven hundred and fifty men are thrown out of employment. Fifty new cars had just been completed which were destroyed. It is the intention of the company to rebuild at once.

Act Reducing Fares Declared Constitutional.

The Supreme Court at Little Rock, Ark., has affirmed the constitutionality and validity of the act of the last Legislature reducing railroad passenger fares to three cents per mile, which was resisted by the Memphis & Little Rock on the ground of a defect in the enrollment of the bill.

The Vermont Commissioners on the Pownal Accident.

The Vermont Board of Railroad Commissioners have laid the blame of the railroad accident at Pownal upon the telegraph operator, whose duty it was to set the switch for the cross-over from the Boston, Hoosac Tunnel & Western line to the Troy & Boston track, going west, and to fasten it, which he failed to do. The operator was 17.

A Georgia Road.

Mr. Baldy, who has been connected with the engineering corps of the eastern extension of the Americus, Preston & Lumpkin Railroad says that work is going bravely on along the new line. The present terminus is at the famous "Joe Brown plantation," where Governor Brown had that phenomenal collard patch in the days of auld lang syne. This place is a few miles east of Gum Creek, the name of which has been changed to "Coney," for Mr. Coney, of the firm of Clegg & Coney, merchants. The wiregrass people think that wherever Senator Brown has lived a railroad is sure to run, sooner or later, and this confirms the truth of the saying.—*Atlanta Constitution.*

Suing for Damages.

A Cincinnati dispatch says: G. R. Harms, of the Palais Royal, and W. W. Post, of the United States Engineer's office, have filed damage suits against the Chicago, St. Louis & Pittsburgh Railroad for being ejected from a train at Krount's Station because their excursion tickets had not been punched at Chicago before they started on the return trip to Cincinnati. Instead of suing for $20,000, as first intended, they each ask $50,000 damages.

One Devil Gets His Deserts.

David Hoffman was hanged at Nebraska City, Neb., lately, for the wrecking of a Missouri Pacific train near Dunbar, a small station ten miles west of the scene of the hanging. In this wreck James De Witt, the engineer, was instantly killed and a number of passengers seriously wounded. The object of the crime was plunder. James Bell, the confederate of Hoffman, turned state's evidence at their trial April 6, and got off with the light sentence of ten years in the penitentiary, though he was equally guilty with Hoffman, who was sentenced to be hanged. Every effort was made by the condemned man's attorney and a sister of Hoffman to save his life, but without avail.

Hoffman's crime was one of the most heineous in the annals of Nebraska railroading. It was proven that he and his accomplice deliberately planned the wreck for the purpose of robbing the dead and wounded passengers. Fortunately their plans partially miscarried, and they had no opportunity for pillage. They were arrested after some trouble, and narrowly escaped lynching. Upon trial they were speedily convicted.

Sir George and his Palace Car Works.

Sir George M. Pullman, and his *fidus achates*, Herr A. Rapp, are back from Europe. The rumor is out that the Italian nobleman will stir up things in the operating department of his company on his return, and that his stay in the old world was curtailed by reason of a dispatch showing the necessity of his presence here. Officials at the home office deny the story that several important heads are to come off.

Blowing off Steam.

It is told of Vice-President Potter, of the Union Pacific, that he entered the power house at the Council Bluffs transfer lately in search of economy. The engineer and an assistant were busily engaged on the latest illustrated papers, but stopped for a moment to cast a cynical glance at the unknown intruder. "What are your duties here, my men?" whispered Mr. Potter, in a mellow, quivering voice. "Why—why we blow the whistle three times a day," cheerily responded the engineer. "We can dispense with the whistles and your services," said Mr. Potter. The order was promptly obeyed, and the whistle and power houses are now silent and tenantless.

A Pleasant Way of Doing Things.

J. Billings, labor agent of the Duluth & South Shore Railroad, visited Mount Pleasant, Mich., a few days ago and hired some laborers. Several Toledo, Ann Arbor & North Michigan Railroad construction men, disliking the idea, mobbed the gentleman and had him run out to the outskirts of town, when 100 influential citizens formed a body guard, re-escorted him back to the town, and gave him the assurance of protection and liberty while there. He left the next day with 30 laborers, and thus the dignity of Mount Pleasant was maintained.

A Nonpareil Life Preserver.

The southern-bound mail train on the Seaboard & Roanoke Railroad came near killing a young lady one day last week. Just beyond Margettsville the road runs for some distance through a kind of swamp, which is a favorite place for fishing. Miss Noni Jaques was sitting on the embankment indulging in the seductive work of angling for eels when the mail came thundering along. There was enough room for her to remain in safety where she was, but with the usual non-presence of mind which generally prevails on such occasions she got up and started across the track. The engineer did his best to stop his train, but was unable to do so. The locomotive struck Miss Jaques and hurled her from the track. The train was stopped and backed to the place where she was supposed to be lying a mangled corpse. The trainmen and passengers, however, were amazed to find a very much frightened and exceedingly angry young lady, who had escaped all injury except having the back of her dress torn out, having been saved from a terrible death by her bustle.—*Norfolk Virginian.*

The Atlanta Fair.

All the roads entering Atlanta except one, which will doubtless join, have agreed to sell excursion tickets to the great fair to be held there next October, at the rate of 1 cent a mile.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Arkansas & Southern, at Little Rock, Ark., Aug. 15.
Atchison, Topeka & Santa Fe, at Topeka, Kan., Sept 5.
Chicago & Atlantic, annual meeting at Hunting ton, Ind. Sept. 1.
Cincinnati, Hamilton & Dayton, special meeting in Cincinnati, Aug. 6.
Little Rock & Eastern, at Little Rock, Ark., Aug. 15.
St. Louis, Arkansas & Texas, special meetings at St. Louis, Aug. 12 and 17.
Shreveport & Arkansas, at Shreveport, La., Aug. 18.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & West Michigan, 1 per cent.
Detroit, Lansing & Northern, 3½ per cent. on preferred stock, payable Aug. 15.
Illinois Central, 3½ per cent. semi-annual, payable Sept. 1.
Middletown & Crawford, 3 per cent., payable Aug. 1.
Pullman's Palace Car Co., 2 per cent. quarterly, payable Aug. 15.
Rome, Watertown & Ogdensburg, 3½ per cent. semi-annual, payable Aug. 15.
Terre Haute & Indianapolis, 3 per cent. semi-annual, payable Aug. 10.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *National Association of General Passenger Agents*, at St. Paul, Minn., Sept. 20.

The *Master Car and Locomotive Painters' Association* New York, Sept. 14.

At Petosky, Mich., on Aug. 18, will occur the next meeting of the Michigan Passenger Association.

General Baggage Agents' Association.

The semi-annual meeting was held at Denver, Col., July 20. A resolution was adopted, though not without considerable objection, that baby carriages and bicycles be carried, when accompanied by the owners, without checking. The next meeting of the association will be in Chicago in January. After adjournment the members took a pleasure trip to Leadville.

Engineers' Club of Minnesota.

A regular meeting was held July 30. The committee to act with the St. Paul club in arranging a joint excursion was continued. An assessment of $5 for current expenses was made. The President read a report of his visit as delegate to the annual convention of the American Society of Civil Engineers, which was ordered printed.

The Southern Railway and Steamship Association.

At the 29th meeting of the Executive Committee, July 14, the following gentlemen were appointed as members of the Rate Committee:

Messrs. J. H. Drake, T. M. Emerson, E. T. Charlton, W. H. Stanford, T. S. Davant, Geo. R. Knox, H. Colebran, S. B. Pickens, A. Pope, G. A. Whitehead, J. M. Culp, G. S. Barnum, E. R. Dorsey, C. H. Cromwell and J. M. Brown.

A meeting of the Rate Committee was held July 15. It was agreed to make Boston differentials five cents higher than New York—this, for instance, as a basis, making Atlanta to New York seventy-five cents; to Boston, eighty cents; otherwise cotton rates are to remain as before adding Birmingham rates five cents per hundred higher than Atlanta. It was agreed that all articles shipped from and through points in this Association to Atlanta, for exhibition at the Piedmont Fair and to Macon, Georgia, for exhibition at the Georgia State Fair, and to Louisville, St. Louis and Spartanburg, S. C., for exhibition at the fairs at said points, full tariff rates be charged from the point of shipment in this Association, or from points on the borders of this association, where business from beyond reaches it, to the above points; and that shipments be returned within above limits free, on presentation to the agent of the billing road of a certificate from the secretary of said fairs, that the goods were on exhibition at the fair and are being billed back to the original point of shipment.

All questions of classification were deferred to the meeting to be held at Asheville, N. C., August 2.

Mr. C. M. Wicker, Chairman of the Transportation Committee of the Chicago Board of Trade, appeared before the committee and gave his views on matters of classification on manufactured articles made largely in Chicago.

Mr. L. D. Richardson, Commissioner of the Chicago & Ohio River Traffic Association, appeared before the committee, urging the necessity of a uniform classification, and stated that he was now having prepared a comparison of the Trunk Lines' classification with that of the Southern Railway and Steamship Association. Mr. Pope suggested that he furnish a copy to the Chairman of this Committee, in order that he may have the same at the next meeting of the committee. This Mr. Richardson agreed to do.

PERSONAL.

—Geo. L. Hurley, General Freight Agent of the Des Moines & Fort Dodge, died suddenly last week.

—Mr. Geo. L Perkins, the veteran treasurer of the Norwich & Worcester road still lives, and is 99 years old to-day.

—E. P. North, Member of the American Society of Civil

Engineers, has been appointed Chief Engineer of the New Haven & Derby.

—Major Lowell Hall, of Grand Rapids, Mich., a pioneer, and for many years a wealthy railroad contractor, died at Grand Rapids July 24, at the ripe age of 84.

R. O. Carscadin, Assistant Master Mechanic of the Chicago, Rock Island & Pacific, at Trenton, Mo., died last week. He had been with the company for 15 years.

—Mrs. Lucy W. Royce, wife of H. F. Royce, General Superintendent of the Chicago, Rock Island & Pacific, was buried at Des Moines, Iowa, July 26. A large number of railroad officials attended the funeral by special train.

—The owner of the building in which are the general offices of the Chicago & Alton road in Chicago is Mrs. Hettie Green, stock speculator in Wall street. She also owns other large properties in Chicago. Her actual yearly expenditures are said to be confined to less than a thousand dollars.

—Nathan Guilford, Assisstant Commissioner of the Trunk Line Association, will, it is said, become General Traffic Manager of the New York Central on the return of Mr. Fink from Europe, about Oct. 1. This department is at present under the charge of Vice-President H. J. Hayden.

—Mr. Harvey D. Chapin died at Springfield, Mass., Aug. 2, aged 71. He began his career in the staging business with his uncle, Chester W. Chapin, but on the beginning of the railroad era he entered that service and remained in it nearly all his life, serving as agent and superintendent on the Erie, Atlantic & Great Western, Chesapeake & Ohio, and other roads.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—The following appointments took effect Aug. 1: J. M. Meade, Assistant Engineer, Eastern Division, office at Topeka; W. H. Earle, Assistant Engineer, Middle and Western Divisions, office at Nickerson; W. H. Baker, Assistant Engineer, New Mexico Division, office at Las Vegas.

Baltimore & Ohio.—J. Van Smith has been appointed superintendent of the Philadelphia Division vice Wilbert Irwin, resigned.

Chicago, Milwaukee & St. Paul.—James H. Veitch has been made General Traveling Agent with headquarters at Chicago. F. W. Boltz has been made Traveling Freight Agent.

Chicago, Rock Island & Pacific.—J. B. Collins has been appointed freight agent for Utah, Nevada, Idaho and that part of Montana south of Garrison, and that part of Wyoming west of Rawlins; headquarters at Salt Lake City, Utah.

Chicago, St. Paul & Kansas.—The directors of this new Kansas company are: E. W. Pierce, St. Louis; Edward R. Ross, J. E. Harris, C. T. Hamilton, M. C. Page, and G. H. Girtler, of Salina, Kan., and F. Haben, of Benton, Mo.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. J. M. Whitman, General Superintendent, having resigned, the duties of the office will be performed by General Manager E. W. Winter.

Grand Trunk, of Canada.—J. F. Walker has been appointed acting Traffic Auditor, in place of T. B. Hawson, resigned.

Hartford & Connecticut Western.—George S. Frink has retired from the board of directors, and James W. Husted has been chosen in his place. The directors elected Mr. Husted President, in place of W. L. Gilbert, of Winsted, resigned.

Illinois Central.—L. T. Moore has been appointed Chief Engineer, with office at Chicago.

Minnesota & Northwestern.—P. C. Stohr has been appointed General Eastern Agent at New York City and W. T. Brock General Agent at Pittsburg.

New Haven & Derby.—E. P. North has been appointed Chief Engineer of this road, recently purchased by W. H. Starbuck.

New York, Lake Erie & Western.—G. G. Cochran has been appointed Western Freight Traffic Manager, with headquarters at Cleveland, O. The office of Assistant Freight Traffic Manager is abolished. S. P. Shane has been made General Freight Agent of the New York, Pennsylvania & Ohio, with headquarters at Cleveland.

Rantoul.—The directors of this new consolidated company are: Stuyvesant Fish, B. F. Ayer, J. C. Welling, John Dunn and Henry DeWolfe.

State Line & Indiana City.—The incorporators of this Indiana company are: J. T. Torrence, Carroll N. Towle, Wm. H. Gostlin, James S. Prentiss and Thomas W. Johnstone.

Wabash Western.—Mr. R. G. Butler has been appointed commercial agent in charge of the Detroit, Butler & St. Louis and Eel River divisions, with headquarters at Detroit.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—A Boston dispatch of July 29, says: The Directors held a meeting to-day, and voted to make a new issue of $10,000,000 of stock. A circular will be issued offering to stockholders the right to take this new stock at par. About $7,000,000 will be devoted to purchases of rolling stock and needed equipments. Accompanying the announcement of these rights an intimation or promise of an increased dividend will be made, beginning with the November dividend, the rate to be 7 per cent. The directors have called a special meeting of the stockholders of the company for Sept. 5, at Topeka, to vote upon the above matters.

It is reported that several surveying and construction parties have been withdrawn from some of the new lines west of the Missouri river, indicating a slackening of the work of extension.

Atlantic & Pacific.—The company have made application at the U. S. Land Office at Las Cruces, N. M., for 43,800 acres of land as indemnity, under the act of Congress of July 27, 1866.

Bangor & Piscataquis.—This company has taken formal possession of the Katahdin Iron Works road under the lease.

Boston & Albany.—Interlocking machines are being put in at Worcester, Charlton and Springfield.

Boston & Quebec Air Line.—The surveys between Skowhegan, Me., and the new line of the Canadian Pacific have been suspended, the railroad commissioners having disapproved of a portion of the proposed location.

Buffalo, New York & Philadelphia.—The reorganization agreement has been modified. The Reorganization Committee has now the right to require to be issued an additional $1,000,000 of first mortgage 5 per cent. bonds for payment of equipment liabilities of Receiver, etc.

Buffalo, Rochester & Pittsburgh.—Sixteen new 60-ton locomotives have just been received, and the road will receive 10 more next month.

Canadian Pacific.—A San Francisco dispatch says the company has purchased, in Antwerp, six steamers, and will have a line of its own between its western terminus and San Francisco.

The first train crossed the new bridge over the St. Lawrence, at Lachine, July 30.

Canadian Pacific "Short Line."—Work on this line is progressing. A contract for the section between Sherbrooke and Farnham has been given to James Ross. Between Sherbrooke and Magog the line is entirely located. A bridge will be built over the River Magog a mile above Sherbrooke. A contract is to be given for a trestle near Easton 3,000 ft. long and 40 ft. high. The contract for the first 4 miles out of Sherbrooke has been given to McCarthy & Gordan. In consequence of an injunction preventing the sale of the line from Waterloo to Magog to the Canadian Pacific there has been delay in the construction of the portion between Sherbrocke and Magog. W. J. Earle is engineer of this division, under H. D. Linnaden, Chief of Construction. It is expected that the road will be graded, ready to receive the rails, from Sherbrooke to Montreal in 6 months.

Cattle Trail Route.—The name of the Montana, Kansas & Texas has been changed as above. The number of directors is reduced from 17 to 11.

Central, of Georgia.—John H. Inman, of New York, is reported to have bought 10,000 shares of the stock of this company.

Central Iowa.—The reorganization committee reports that three-quarters of the junior securities and half of the first mortgage bonds have been deposited under the plan of reorganization. President Stickney is quoted as saying that if the present plan fails he will build branches of the Minnesota & Northwestern to control the Central Iowa territory.

Central Massachusetts.—It is reported that a cut-off is to be built so as to make a line by this road and the Worcester & Nashua, now both controlled by the Boston & Maine, between Boston and Worcester several miles shorter than via Oakdale. Such a line, it is said, would be about 46 miles long. The distance by the Boston & Albany is 44 miles.

Track is now completed to a point four miles west of Ware and most of the contractors' gangs are now at work near Northampton. Station buildings are in course of erection between Oakdale and Ware.

Central Pacific.—Vice-President C. P. Huntington, at a conference in London with English shareholders, has promised to hereafter publish monthly statements of net earnings, and to furnish other information which the shareholders complain has been hard to get. He also stated that the Southern Pacific guarantee extended to the additional $8,000,000 of stock recently issued to the Oregon & California shareholders.

Chicago & Eastern Illinois.—The extension from Sidell Ill., to Tuscola is finished.

Chicago, St. Paul & Kansas.—Articles of incorporation were filed in Kansas, Aug. 1. The road is projected to run from a point on the north line of the state, on the north line of Washington or Republic county to a point on the south line of Barber county, and the west line of Meade county. The estimated length is 350 miles. Three branches are also mentioned, two of them 100 miles long and one 250 miles long. Capital stock, $15,000,000.

Cincinnati, Indianapolis, St. Louis & Chicago.—The extension of this road known as the Cincinnati & St. Louis Coal road, extending from Columbus to Switz City, Ind., 70 miles, is rapidly receiving the required subsidies and donations to insure completion. It connects at Switz City with the Indiana & Illinois Southern.

Des Moines & Fort Dodge.—This road will hereafter be known as the Des Moines & Fort Dodge division of the Chicago, Rock Island & Pacific, by which company it has been leased.

Fitchburg.—The washouts near Miller's Falls caused by the storm of July 24 have been temporarily repaired and trains were run through July 30. The track was more or less undermined in 59 different places within a distance of six miles.

A second heavy rain on Tuesday of this week again interrupted traffic, the high water carrying away a 100-ft. trestle.

Georgia Midland & Gulf.—Ninety miles of 56-pound steel rails are now laid, and a connection with the East Tennessee, Virginia & Georgia will be made in a few days at McDonough, Ga., 98 miles from Columbus. Double daily passenger trains are now running, connecting with the Central at Griffen. Two additional Baldwin locomotives were received the 26th inst. The Georgia Midland Construction Co. are contractors for building and equipping the road.

Grand Trunk.—The Coroner's jury in the case of the St. Thomas accident have placed the blame for the disaster on Henry Donnelly, the engineer and Richard Spettigue, the conductor, who, they say, were guilty of criminal negligence. They also find the officials of the road guilty of carelessness in allowing Donnelly to have charge of an engine while he was in a condition which rendered him unfit for duty, and also in permitting the train to depart without the air-brake being examined.

Kansas City, Lawrence & Nebraska.—A surveying party has just gone into the field for preliminary location, starting from Lawrence.

Lehigh Valley.—This company from August 1 operates the new road from Harvey's Lake to Bennett, on the Delaware, Lackawanna & Western.

Louisville, Evansville & St. Louis.—Work has begun on the extension from Huntingburg to Tell City, Ind.

Marietta & North Georgia.—The Georgia Legislature has refused to amend the charter of this company so as to allow it to extend its road to Atlanta, on the ground that it would compete with the Western & Atlantic, which is owned by the state.

Memphis & Charleston.—The engineers have located the line in Chattanooga. They will bridge the Tennessee River near the Citico furnace at the eastern end of Chattanooga. The road will be extended from Stevenson, Ala., its present terminus, to Chattanooga.

Milford, Franklin, Providence & Hopkinton.—It is reported that this road, extending from Ashland, on the Boston & Albany, through Milford to Franklin on the New York & New England, 20 miles, has been leased to the latter company.

Minneapolis & St. Louis.—The Pacific division is completed to Forman, Dak., 241 miles from Minneapolis.

Minneapolis, Sault Ste. Marie & Atlantic.—The line between Minneapolis and Turtle Lake, Wis., is expected to be completed by Sept. 1

Minnesota & Northwestern.—Double daily fast trains are now run between Chicago & Minneapolis. They leave either city at about 7 a. m and 7 p. m., and run through in about 15 hours. The night trains are to have Mann Boudoir cars. The road now uses its own track, and runs its own trains into Chicago, using the Wisconsin Central terminal facilities.

New Roads.—A line five miles long is to be built in the interest of the Long Island road from Locust Valley, L. I., to Oyster Bay.

It is said that a railroad is to be built from Corinth to Pittsburgh Landing, where the battle of Shiloh was fought.

New York Central & Hudson River.—The Lewiston Branch has been extended and the Lewiston station removed to the Niagara River, a distance of a mile and a half, where connections will hereafter be made with the steamers to and from Toronto. This branch extends from Niagara Falls along shelving rock overlooking the magnificent scenery of the Niagara gorge. Observation cars will hereafter be run between Niagara Falls and Lewiston, and much pleasure travel is expected.

New York City & Northern.—This road will be sold under foreclosure on Aug. 17, at the Real Estate Exchange, New York City. Over $3,100,000 of securities have already assented to the reorganization plan. The committee gives notice that the time for assenting without penalty (originally fixed for July 23) is extended to Sept. 3, after which an assessment of $20 for each $1,000 bond certificate will be required.

New York, Lake Erie & Western.—The company has extended its contract with the City of New York for the use of the Twenty-third street ferry terminal for ten years, from May 1, 1887, at $10,000 per year.

Northern Pacific.—The contracts for the snow sheds on the Cascade Division have been let. Hoffman & Bates have the contract for the side west of the mountains, and Hugh Glenn & Co. that for the east side.

The switchback over the Cascade Mountains, 13 miles long, is said to have cost $350,000. In working it each train of six cars has a heavy decapod engine at *each* end.

Oregon Pacific.—Tracklaying has begun between Albany and Santiam.

Oregon Railway & Navigation.—Work has begun on the bridge across the Willamette at Portland.

Pacific.—At San Francisco, July 28, President Leland Stanford testified at great length before the investigating Commission concerning the whole history of the Central Pacific, claiming that the road was chartered by the State of California and that the National government therefore has no jurisdiction; that the government has not allowed reasonable rates for the service performed for it by the road: that the later transcontinental roads have been granted land subsidies more favorable than those received by the Central Pacific, and that if the government had kept all its promises the obligations of the road to it would now be nearly liquidated. He makes out a total claim against the government of $63,000,000. He refused to state whether or not any money had been used to influence legislation.

On Aug. 1 the Commission examined D. S. Yost, formerly private secretary of Leland Stanford. F. S. Douty, secretary of the Western Development and Pacific Improvement Companies, refused to produce books showing the cost of portions of the Central Pacific road. On Aug. 2, Leland Stanford was further examined, and a long discussion ensued as to the portions of the records which it would be fair and just to make public. The commission had applied to the United States Circuit Court for an order compelling Douty to produce the books that had been asked for, but the road's counsel finally agreed to produce them, reserving the privilege of snatching them away again whenever it should seem to him best to do so.

Pacific Mutual Telegraph.—Workmen have begun building the Pacific Mutual Telegraph lines west from Kansas City, Mo. The line will be in working order to Topeka within a few days. From the latter city it will be pushed to Wichita as fast as possible.

Pennsylvania.—Arrangements have been made with the Richmond & Danville, Atlantic Coast Line and Seaboard & Roanoke for fast freight lines similar to the "Star Union," to handle the business between New York, Philadelphia and other Northern points, and the prominent cities of the South.

The company has made formal application to the Jersey City Board of Public Works for permission to elevate the passenger tracks from the Ferry to Brunswick street.

Philadelphia, Wilmington & Baltimore.—Thirty miles of second track have been laid on the Delaware division.

Poughkeepsie, Hartford & New England.—This company has filed articles of incorporation in New York. The proposed road will run from Poughkeepsie in a northeasterly direction through Hibernia, Stanfordville, McIntyre, Stissing, Attlebury and Pine Plains to a point near Silvernails Bridge, where it connects with the Hartford & Connecticut Western. The new road will be about 28 miles in length and the capital stock is given as $285,000.

Rantoul.—Articles of consolidation of the Leroy & Eastern, an Illinois company, and the Lebanon & Western, an Indiana company, have been filed. The roads connect at the state line and will hereafter be known as the Rantoul Railroad Co., with headquarters at Chicago.

Red River Valley.—James Hutton & Co., of Montreal, have contracted to deliver 6,000 tons of steel rails for this road, weighing 56 pounds to the yard.

St. Louis, Alton & Terre Haute.—Under date of Aug. 1, the President issues a circular to the stockholders, stating the terms of subscription to the bonds of the Chicago, St. Louis & Paducah, a company organized to build a line of some 60 miles from Marion, Ill., to Paducah, Ky. At the last annual meeting the stockholders ratified the lease of the St. Louis Southern, extending to Marion, and authorized the lease of the Chicago, St. Louis & Paducah. The city of Paducah has voted a subscription in 4½ per cent. bonds to the capital stock of the latter company, which has executed a contract with "a most reliable and experienced engineer" for the construction and equipment of its road. The St. Louis, Alton & Terre Haute is to lease the new road for 980 years, at a rental of 30 per cent of the gross earnings, and guarantees a minimum rental sufficient to pay interest on its first mort-

gage bonds. The contractor delivers to the St. Louis, Alton & Terre Haute the entire capital stock of the new company and one-half its second mortgage bonds. Until Aug. 22 the stockholders of the St. Louis & Terre Haute will have the privilege of subscribing for the bonds of the Chicago, St. Louis & Paducah on terms announced.

St. Louis & San Francisco.—This road has commenced reporting to the Southwestern Railway Association, and has sent a report of its business since July 1. This will be incorporated by Mr. Midgely in future statements sent out from his office.

St. Paul, Minneapolis & Manitoba.—It is stated that the company has given a contract to the Globe Iron Works, of Cleveland, O., for six steel steamships, each to cost $220,000 The vessels are for a line between Duluth, Minn., and Buffalo, N. Y.

Sioux City & St. Paul.—The Secretary of the Interior has, at the instance of settlers in O'Brien County, Ia., ordered that the road be required to give up 17,600 acres of land in that county, which it is claimed are held in violation of the Act of March 3, 1887.

South Chicago & Southern.—This road is building from a point on the Pittsburgh, Fort Wayne & Chicago, about 14 miles out of Chicago, southward, to connect with the Chicago, St. Louis & Pittsburgh at a point a short distance west of Lansing. The work is nearly completed. It is controlled by the Pennsylvania.

Southern Ohio River.—Grading has been completed to Rising Sun, Ind., and tracklaying has begun at Lawrenceburg.

Springfield & New London.—This short branch of the New York & New England was finally deeded to the latter company July 29.

State Line & Indiana City.—Articles of incorporation filed in Indiana. The proposed road will be about 25 miles long, running from the Eastern Illinois boundary to Indiana City on Lake Michigan. Capital stock, $250,000.

Tennessee Midland.—The Virginia Construction Company announces awards of contracts for the graduation, trestling, piling and cross-ties, for that part of the Tennessee Midland between Memphis, Tenn., and the Tennessee River, a distance of about 135 miles, as follows:

Graduation—To Robt. Johnson, Memphis, Tenn.; Cook & Gaines, Princeton, Ky.; McGowan & Brown, Holly Springs, Miss.; W. Ferguson & Co., Danville, Tenn.; H. C. Tate & Co., Memphis, Tenn.; J. S. McTighe & Co., Memphis, Tenn.; Finley & Clayton, Tupelo, Miss.; Jno. L Wisdom & Co., Jackson, Tenn.

Trestling and Piling.—Memphis to and including Wolf River Bottom, to Cook & Gaines, Princeton, Ky.; Wolf River Bottom to and including Big Hatchie Bottom, to T. L. & C. J. Houser, Gadsden, Ala.; Big Hatchie Bottom to Jackson, Tenn., to R. DeT. Lawrence, Aberdeen, Miss.

Cross-Ties.—Memphis to Somerville, Tenn., to D. H. Pitts & Co., Scottsville, Va.; Somerville to the line between Madison and Henderson Counties, to Brittain, Pierce & Co., Jackson, Tenn.; Henderson County line to Tennessee River, to D. H. Pitts & Co., Scottsville, Va.

Union Pacific.—Vice-President Potter, in an interview at Chicago, says the Salina, Lincoln & Southwestern branch of the Kansas Pacific division will be completed by Dec. 1. Work on it has just been resumed. The new line from Oakley, Kan., to Colby will be completed Sept. 15, and that from Cheyenne, northwest, by Sept. 1.

Wabash.—Receiver McNulta submits the following statement of receipts and disbursements from June 1 to June 30 inclusive: Balance cash on hand May 31, $334,154; receipts, June 1 to 30, on accounts prior to April 1, $47,464; receipts for same period on current account, $763,178; total, $1,444,796. Disbursements, June 1 to 30, on accounts prior to April 1, $75,051; disbursements for same period on current accounts, $622,010; total, $697,061. Balance cash on hand June 30, $447,734.

Wadesboro & Winnsboro.—Organized to build a road from Wadesboro, N. C., to Winnsboro, S. C.

Wisconsin Central Company.—This is the name of the company that has been formed to consolidate the securities of the various affiliated roads now worked in the interest of the Wisconsin Central.

TRAFFIC AND EARNINGS.

Coal.

The coal movement for the week ending July 30 is reported as follows:

	1887.	1886.	Inc. or Dec.	P.c
Anthracite	682,847	423,727	I. 259,120	61.0
Bituminous	193,325	198.624	D. 5,299	2.6
Coke (July 23)	38,426	73,943	D. 35,517	48.0

The coal tonnage of the Pennsylvania road for the week ending July 23 was:

	Coal.	Coke.	Total.	1886.
Line of road	179,332	38,426	217,758	242,605

Decrease for the week, 24,847 tons, or 10 per cent.

Cotton.

The cotton movement for the week ending July 29 is given as below, in bales:

Interior markets:	1887.	1886.	Inc. or Dec.	P. c.
Receipts	1,207	7,659	D. 6,452	84.2
Shipments	2 458	14.843	D. 12,385	83.4
Stock	27,937	57,626	D. 29,689	51.3
Seaports:				
Receipts	2,581	9,060	D. 6,479	71.5
Exports	22.145	22,222	D. 77	.3
Stock	192,058	234,767	D. 42,709	18.2

Total movement from plantations for the crop year ending July 29 was 6,345,618 bales, against 6,457,006 for last year, 5,593,842 in 1884-85, and 5,644,523 in 1883-84.

East-bound Shipments.

The shipments of flour, grain and provisions from Chicago and common points to through points in the east, for the week ending July 31, amounted to 27,872 tons, against 27,286 for the preceding week, an increase of 586 tons. The percentages carried by the different roads were: Chicago & Grand Trunk, 12.0; Michigan Central, 17 6; Lake Shore, 17.4; Fort Wayne, 25.5; Chicago, St. Louis & Pittsburg, 15.4; Baltimore & Ohio, 4.6; New York, Chicago & St. Louis, 6.9; Cincinnati, Indianapolis, St. Louis & Chicago, 0.6.

The Inter-state Commission.

The Merchants' Freight Bureau of New York, of which Thomas L. Greene is Secretary, has formally presented to the Commission its complaint against the increased difference between car-loads and smaller shipments required by the new trunk line classification. The Merchants' position is well known to our readers; they say the complaint represents 281 merchants in various states, and it is based on the claim that the present rates constitute an undue preference to individuals and localities.

The Baltimore & Ohio and the Erie Express companies have signified their intention of complying with the recent circular of the board requiring express companies to regard themselves as subject to the Inter-state law and to send in their tariffs to the commission. The United States Express Co. says it will bring forward reasons for denying the jurisdiction of the board over it.

In the case of W. H. Heard, the colored man who complained against the Georgia Railroad Co. that he was refused first-class accommodations and compelled to ride in the "Jim Crow" car, the respondent replies rather frivolously that "it has in no way given or authorized such designation of any car on its road. There is an accommodation train running out of Augusta spoken of popularly as "the Picayune." At the Atlanta end a similar train is known as "The Goober." But these designations or nicknames are merely effusions of popular pleasantry beyond control of respondent and considered by respondent up to this time (perhaps erroneously) as entirely innocuous. If any of respondent's cars have been spoken of by evil-disposed persons as "Jim Crow" cars, respondent is not aware of it, but prays, if the fact is shown to exist, that the Commission will, if its large powers extend to such a case, afford appropriate and adequate relief to respondent." The answer further avers that the cars provided for colored passengers are equally as safe, comfortable, clean, well ventilated and cared for as those provided for whites. The differences, it says, if any, "relate to matters æsthetical only, and consist in higher ornamentation and matters of that sort rather than in those which affect the substantial conditions of safety, comfort and convenience."

Chicago-St. Paul Rates.

The Minnesota & Northwestern opened its road for freight traffic between the above named cities Aug. 1, and at once announced a freight tariff about 33 per cent. lower than those of the old lines. This road is a member of the Northwestern Freight Association, and according to the rules of that organization should have notified the other members 15 days before making any change. The other roads held a meeting and condemned the cutting, but reduced their rates to conform to those of the new line. The Minnesota & Northwestern claims that the rates in force since April 1, are too high to enable the roads to fairly compete with the Lake route via Duluth.

Philadelphia Centennial Celebration.

The Pennsylvania, Baltimore & Ohio, and Philadelphia & Reading roads have issued the following joint circular concerning rates to Philadelphia for the centennial celebration of the adoption of the Constitution of the United States, Sept. 17 next:

"To accommodate persons desiring to visit Philadelphia on this occasion, connecting lines are hereby authorized to sell round-trip tickets from Sept. 8 to 17, inclusive, good to return to Sept. 22, inclusive, at rates based on 2 cents a mile for distance traveled from their respective stations to Philadelphia and return. For military and other organizations in uniform, traveling together on one ticket in each direction, and amounting in number to 25 or over, connecting lines are authorized to issue tickets to Philadelphia and return from points within trunk line territory—that between New York and Pittsburgh, Parkersburgh, West Virginia and Buffalo—at one fare for the round trip, and from points beyond said territory at 1 cent per mile for distance traveled from the various starting points to Philadelphia and return. In issuing tickets for organizations at these rates, such reasonable time limits may be adopted as will be satisfactory to the visitors and at the same time sufficiently protective to the railroad lines."

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Month of June:				
Chi., St. L. & P.	$436,876	$379,821	I. $57,055	15.0
Net	79,209	33,956	I. 45,253	132.9
Det., B. C. & Al.	49.407	.....	.....	.....
Net	22.606	.....	.....	.....
*Mexican Cen.	353,645	274,764	I. 78,881	28.6
Net	128,645	78 712	I. 49.933	63.6
Nash., C. & St. L.	241,071	178.139	I. 62,932	35.3
Net	117,830	75,205	I. 42,625	56.7
*Oreg. R. & N.	423,750	481,735	D. 57,985	12.0
Net	199,750	240,014	D. 40,264	16.7
N. Y., Sus. & W.	106,283	84,057	I. 22.226	26.4
Pitts. & West.	150,584	140,347	I. 10,237	7.2
Tol., P. & West.	67,238	61,093	I. .6,145	10.0
Month of May:				
Cairo, V. & C.	$63,102	$55,530	I. $7,572	13.6
Net	22,005	13,071	I. 8,934	68.1
C., I., St. L. & C.	217,707	191.698	I. 26,009	13.5
Net	80,033	64,464	I. 15,569	24.1
Rome, W. & Og.	234,638	212,058	I. 22,580	10.6
Net	90,808	75,007	I. 15,801	18.4
Southern Pac. Co.:				
Gal., Ha. & S. A.	368,087	191,471	I. 176,616	92.2
Net	137,755	Df. 18,713	I. 156,468	.....
Louisia. & West.	73,281	46,550	I. 26,731	57.3
Net	40,252	18,070	I. 22,182	122.5
Morgan's L. & T.	339,148	280,245	I. 58,903	18 5
Net	89,932	32,982	I. 56,950	172.5
N. Y., T. & M.	23,215	11,430	I. 11,785	103.3
Net	9,478	Df. 1,558	I. 11,036	.....
Texas & N. O.	117,436	63,004	I. 54,432	86.3
Net	64,938	17,933	I. 47,005	26.2
Atlantic System	914,167	592,700	I. 321,467	54.2
Net	342,355	48,715	I. 293 640	603.9
Pacific System	2,227,147	2,146,525	I. 80,622	3.7
Net	1,155,400	1,192,560	D. 37,160	3 0
Total all	3,141,314	2,739,225	I. 402,089	14.6
Net	1,497,755	1,241,275	I. 256,480	20.6
Five months—Jan. 1 to May 31:				
Cape F. & Y. Vy.	$105,484	$90,151	I. $15,333	16.9
Net	49.970	47,311	I. 2,659	5.6
C. R. R. of Ga.	2,343,169	2,296,759	I. 46 410	20.2
Net	653 285	543.889	I. 109,396	20.1
Ches. & Ohio	1,674,279	1,497,019	I. 177,260	11.8
Net	487,154	431,945	I. 55,209	12.7
E., L. & B. S.	389,997	326,064	I. 63,933	19.6
Net	110 663	101,066	I. 9,597	9.4
C. O. & S. W.	681.331	607,661	I. 73,670	12.1
Net	239,424	188,690	I. 50,734	26.8
Chi., Bur. & No.	1,067,648	.....	.....	..
Net	275,320	.....	.....	.....
C., C., C. & I.	1,604 972	1,483,487	I. 181,485	12.2
Net	563,508	441,084	I. 122,424	27.7
Den. & R. G. W.	377,797	378.111	D. 314	....
Net	74,815	106,296	D. 31,481	29 6
Lou., N. O. & T.	808,972	629,798	I. 179,174	28.4
Net	219,819	116,593	I. 103,226	88.5
Minn. & St. L.	615,011	568.932	I. 46,029	8.0
Net	135,301	134,294	I. 1.007	.7
Minn. & N. W.	397,709	134,791	I. 262,918	19.5
Net	93,390	36,414	I. 56,976	156.4
N. Y., Sus. & W.	510,416	419,730	I. 90.686	21.8
Net	230,622	176,666	I. 53,956	30.5
Oregon Imp. Co.	1,466,394	967,759	I. 498,655	51.5
Net	334,505	133,179	I. 201,326	151 1
Oregon R. & N. Co	1,836,178	1,848,578	D. 12,400	.6
Net	681,202	687,776	D. 6,574	.9
St. Jo. & Gd. I.	453,410	458,907	D. 5,497	11.9
Net	168,948	215,387	D. 46,439	21.5
Wabash, East of Miss.	2,401,881	2,472,706	I. 19.175	.8
Net	790,655	449,538	I. 341,117	75 8
Total (gross)	$15.817,000	$14,180,483	I. $1,636,517	11.5
Total (net)	4,833,261	3,810,128	I. 1,023,133	26.8

Six months—Jan. 1 to June 30:	1887.	1886.	Inc. or Dec.	P. c.
Atch., T. & S. Fe.	$9,071,135	$6,941,368	I. $2,129,767	30.6
Atlantic & Pac.	1,321,592	660,802	I. 660,790	99.9
Buff., N. Y. & P.	1,257,372	1,200,637	I. 56,735	4.7
Buff., R. & Pitts.	940,264	618.165	I. 322,099	52.1
Bur., C. R. & No.	1,372,471	1,265,633	I. 106,838	8.4
Cairo, V. & C.	344,420	280,620	I. 63,800	22.7
California South.	732,273	505,435	I. 426,838	13.9
Canadian Pac.	4,689,286	4,160,342	I. 528,944	12.6
Cape F. & Y. Vy.	123,469	104.874	I. 18,595	17.7
Central of Iowa.	617.216	598,446	I. 18,770	3.1
Ches. & Ohio.	2,055,725	1,819 818	I. 235,907	12.9
Eliz., L. & B. S.	177.820	393,475	I. 84,345	21.4
Ches., O. & S. W.	826,475	730,267	I. 96,208	13.1
Chic. & Atlantic.	1,016,750	705,655	I. 311,095	44.0
Chi. & East. Ill.	939,720	793,023	I. 146,697	18.4
Chi., Mil. & St. P.	11,194,000	10,637,876	I. 556,124	5.2
Chi. & W. Mich.	660.209	643,694	I. 16,515	2.5
Cin., H. & Day.	1,527,187	1,303,607	I. 223,580	17.1
C., I., St. L. & C.	1,273.635	1,202,568	I. 71,067	5.9
C., Jack. & Mack.	203,779	184,414	I. 19,335	10.4
Cin., N. O. & T. P.	1 569.035	1,281,547	I. 287,488	22.4
Ala. Gt. South.	714.920	544,874	I. 170,046	31.2
N. Ori. & N. E.	317,936	300,769	I. 17,167	5.7
Vicks. & Mer.	240,423	238.215	I. 2,208	.9
V., Shre. & P.	239,088	196,842	I. 41,246	20.9
Cin., R. & Ft. W.	190,527	171,348	I. 19,179	11.1
Cin., W. & Balt.	986,567	910,216	I. 76,351	8.3
Cleve., Ak. & C.	265,771	249,605	I. 16,166	6.4
Cleve. & Canton.	172.503	160,906	I. 11,597	7.2
Cl., C., C. & I.	1,979,936	1,784,830	I. 195,106	10.9
Cleve. & Mar.	149,231	136,121	I. 13,110	9.6
Cl. & Cin. Mid.	146,920	134,599	I. 12,341	9.1
Col., H.Vy. & Tol.	1,237,541	980,680	I. 256,681	26.1
Den. & R. G.	3,526,445	2,879,941	I. 616,504	21.4
Den. & R. G. W.	467,847	467,539	I. 308	.....
Det., B. C. & Al.	220,146	95,780	I. 124,366	129.8
Det., Lan. & No.	545,370	562,584	D. 17,214	3.0
E. Ten., Va. & G.	2,361,827	1,891,366	I. 470,461	2.4
Ev. & Ind'apolis.	110.639	73,815	I. 36 824	50.0
Ev. & Terre H.	398,323	329,841	I. 68,482	20.7
Flint & Pere Ma.	1,262,356	1,075,184	I. 187,172	17.4
Fla. Ry. & N.	533,415	478,447	I. 54,968	11.6
Ft. W. & Den. C.	289,909	170,366	I 119.543	70.1
Georgia Pacific.	521,784	348,386	I. 173,398	49.8
Grand Rap. & I.	1,073,77	887,209	I. 186,563	21.0
Gr. Trunk of C.	8,458,836	7,788 962	I. 669,874	8.6
Houston & T. C.	1,079,051	1,062.969	I. 16,082	1.5
Illinois Central:				
Ill. Div.	3,400,474	2,923,019	I. 477,455	16.3
South. Div.	1,848,928	1,800,914	I. 48 014	2.6
Ced. F. & M.	56,750	80,479	D. 23,729	29.4
Dub. & Sioux C.	386,063	422,746	D. 36,743	8.6
Iowa F. & S. City	301,846	269,954	I. 31,892	12.2
Ind., Bloom. & W.	1,199,076	1,130,999	I. 68,077	5.0
Ind., Dec. & Spr.	192,493	177,794	I. 14,699	8.3
K. C., Ft. S. & G.	1,292,428	1,169,014	I. 123,414	10.5
K. C., Spr. & M.	981,574	695,138	I. 286,436	41.2
K. C., Clint. & S.	121,989	106,205	I. 15,784	14.8
Keokuk & West.	144,846	141,107	I. 2,739	2.6
Lake Erie & W.	906,583	742,252	I. 164,331	22.1
Lake S. & M. So.	8,603,557	6,935,682	I. 1,669,875	24.0
Lehigh & H. R.	120,538	101,370	I. 19,168	18.9
Long Island.	1,326,300	1,222,505	I. 103,795	8.4
Lou., Ev. & St. L.	463,854	374,019	I. 89 835	24.0
Louis. & Nash.	7,397,726	6,330,533	I. 1,067,193	16.8
Lou., Alt. & C.	1,019,151	785,132	I. 234,019	29.8
L., N. O. & Tex.	917,201	731,476	I. 185,725	25.3
Manhattan Elev.	5,055,727	3,724 065	I. 332,662	8.9
Marq., H. & O.	385,287	375,208	I. 10,079	2.6
Mem. & Charles.	756,932	595,006	I. 161,926	27.1
Mexican Cen.	2,321,053	1,843,266	I. 477,787	25.9
Mexican National:				
South. Div.	559,243	502,201	I. 57,042	11.3
M. C. & Can. So.	6,361,000	5,436,000	I. 925,000	1.7
Mil., L. S. & W.	1,444,404	942,769	I. 501,635	53.2
Mil. & North.	441,403	291,690	I. 149,713	51.1
Minn. & N. W.	513,520	178,381	I. 335,391	187.9
Miss. & Tenn.	205,459	180,391	I. 25,068	13.3
Mobile & Ohio	1,118,916	970,926	I. 147,990	15.2
Nash., C. & St. L.	1,454,280	1,080,802	I. 373,478	34.5
N. Y. C. & H. R.	16,725.725	14,912 612	I. 1,813,113	12 1
N. Y. City & No.	267,673	249.372	I. 18,301	7.3
N. Y., Ont. & W.	660,442	588,390	I. 72,052	12.2
Norfolk & West.	1,854,273	1,423,106	I. 431,167	30.2
Northern Pac.	5.399.193	4,987,257	I. 411,936	8.2
Ohio Southern.	269,498	226,581	I. 42,917	1.9
Oreg. R. & N. Co.	2,259,928	2,331,313	D. 71,385	3.0
Peoria, Dec. & E.	412,595	337,367	I. 75,228	22.3
Rich. & Danville.	1,992,497	1,889,299	I. 103,198	5.4
Va. Mid. Div.	728,641	686.749	I. 42,892	6.1
Chas., C. & A.	368,860	376,808	D. 7,948	2.1
Col. & Gr. Div.	250,553	309,629	D. 56,076	18.2
West. N. C. Div.	303,076	240,143	I. 62.933	26.2
Wa., O. & W.	49,600	43,600	I. 6,000	13 7
Ash. & Sp. Div.	22,200	12,530	I. 9,670	77.3
St. Jo. & Gr. I'd.	537,728	546,984	D. 9,256	1.7
St. L., A. & T. H.:				
Main Line	639,199	567,551	I. 71,648	12.2
Branches	422,590	328,292	I. 94,298	28.7
St. L., A. & Tex.	1,003,280	730,274	I. 273,006	37.3
St. L. & San F.	2,675,685	2,046,464	I. 629,221	30.7
St. P. & Duluth.	674,624	576,500	I. 98,124	17.0
St. P., M. & Man.	3,454,109	2,947.518	I. 506,591	17.2
Shenandoah Val.	393,638	300,921	I. 92,717	30.8
South Carolina.	532,154	521,0.0	I. 11.144	2.1
Staten I'd R. T.	354,718	311.538	I. 43,180	13.8
Texas & Pacific.	2,596,775	2,492,269	I. 104,506	4.1
Tol., A. A. & N. M.	225.011	153,553	I. 71,458	46.5
Tol. & Ohio Cen.	469.417	354,148	I. 115,269	32.6
Wabash (West)	2,927,698	2,572,439	I. 355,259	13.8
Wheeling & L. E.	344,711	265,910	I. 78,801	29.6
Wisconsin Cen.	978,158	731,137	I. 247,021	33 7
Min., S. C. & W.	235,131	112,443	I. 122,688	109 1
Wis & Minn.	427,888	84,248	I. 343,645	408.1
Total	$170,459,725	$146,266,668	I. $24,415,408	....
			D. $222,351	..
Net			I. 24,193,057	16.5
Six months—Jan. 1 to June 30:				
C., St. L. & P.	$2,667,885	$2,166,578	I. $501,307	23.1
Net	585,661	200,516	I. 385,145	192.0
Det., B. C. & Al.	218,709	.....	.....	..
Net	105,084	.....	.....	.....
*Mexican Central.	2,321,053	1,843,266	I. 477,787	25.9
Net	1,051,035	586,790	I. 464,245	79.1
Nash., C. & St. L.	1,454,280	1,080,802	I. 373.388	34.5
Net	642,023	417.194	I. 224.829	53.8
*Oreg. R. & N.	2,259.928	2,331.313	D. 71,385	3.2
Net	880,982	927,790	D. 46,808	4.0
Eight months—Oct. 1 to May 31:	1886-87.	1885-86.		
†Rome, W. & Og.	$1,898,391	$1,740,448	I. $157,933	9.0
Net	808,987	701,709	I. 107,278	15.2
Eleven months—July 1 to May 31:				
C., I., St. L. & C.	$2,466,996	$2,232,744	I. $234,252	10 4
Net	972,347	861,085	I. 111,262	12 9
Year to June 30:				
Iron R. R.	$85,764	63,427	I. $22,337	35.2
Net	45.148	31,022	I. 14,126	45.5
Nash., C. & St. L.	2,774,248	2,188,110	I. 586,138	26.7
Net	1,195,637	865,252	I. 330,385	38.1

* June estimated. † Including Black River road in both years.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Uniform Coupon Tickets.

The committee appointed at the last convention of the National General Passenger and Ticket Agents' Association has agreed upon a report embodying a plan by which it is confidently believed that tickets uniform in style, size, tint and other characteristics will be generally adopted.